民國四十三年度

# 高中高職入學試題精解

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# 英文科試題

## 省立臺北工業專科學校

I Vocabulary.

(a) 試寫一年中四季名稱

❶ spring ❷ ❸ ❹

(b) 試寫一年中十二月名稱

❶ January ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬

(c) 試寫一週間七日名稱

❶ Sunday ❷ ❸ ❹ ❺ ❻ ❼

II 試寫(A)十個對義字 (Antonyms)

例：cold(Adj.)_____hot (Adj.)

❶ night (n.)..... ( ) ❷ above (prep.)..... ( )
❸ little (adv.)..... ( ) ❹ sick (adj.) ..... ( )
❺ love (verb) ..... ( ) ❻ thick (adj.) ..... ( )
❼ likes (n.) ..... ( ) ❽ proud (adj.) ..... ( )
❾ alive (adj.) ..... ( ) ❿ over (prep.) ..... ( )

(B) 十個同音字 (homonyms)

例：sun_____son

❶ sell..... ( ) ❷ fair..... ( ) ❸ pale..... ( )
❹ lesson ... ( ) ❺ flour ... ( ) ❻ some ... ( )
❼ dew ..... ( ) ❽ right ... ( ) ❾ pray..... ( )
❿ meat..... ( )

III 下列各句有意義缺而不全，試以適當字語補足之。

❶ I am..... ❷ He becomes.....
❸ They proved ..... ❹ The silk feels .....
❺ He got..... ❻ You look .....
❼ The meat smells ..... ❽ Sugar tastes.....
❾ Things do not stay ... ❿ The street boys go.....

IV 改錯 (不錯者不改)：20%

❶ It is they.
❷ My little baby has hurt its two tiny feet.
❸ He had better told the truth.
❹ My name is called George Wong.
❺ I am called Anne Ling.
❻ He robbed my wrist watch. (手錶)
❼ I shall go to the place it is cool.
❽ You are going to where? (疑問句)
❾ How pretty is it! (感歎句)
❿ We lived before there. (我們從前住在那邊)

Ⅴ 根據下列造句公式每型寫二句。20%

❶ It is + Adjective + Infinitive.
例句：It is easy to write.
(a) (b)

❷ How + Adjective + Subject + Verb
例句：How strange he is!
(a) (b)

❸ Subject + Verb + Indirect Object + Direct Object.
例句：He asked me a difficult question.
(a) (b)

❹ Although + Clause + Clause.
例句：Although he is an old man, he can read without glasses.
(a) (b)

❺ Clause + but + Clause.
例句：It is an interesting book, but I can not read it now.
(a) (b)

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**注意**：(一) 此卷上不可塗寫或作答案，答案作在答案紙上。
(二) 交卷時此卷與答案紙都要交上，否則作零分計算。
(三) 每題分數相等。
(四) 考試時間爲100分鐘。

**作法** 下面一共有選擇題150題，每題四個答案，在四個答案之中，有一個是對的，或是四個都不對。請你仔細選擇：

例 1 We_____Chinese.
① am ② is ③ are ④ be
正確的答案是③，所以在答案紙上例 1 後面第③號圓圈裡劃了一個加號（+）

例 2 When you get sick, you take _____
① tobacco ② medicine ③ meat ④ pineapple
正確的答案是②，所以在例 2 後面第②號圓圈裡劃了一個加號（+）

例 3. John _____Mary are good students.
① with ② to ③ for ④ by
這四個答案沒有一個是正確的，所以在例 3 後面第(○)號圓圈裡劃了一個加號，這便是作答案的方法，不用你寫字紙要在適當的圓圈裡作個加號(+)就行了。

❶ A_____has two wheels.
① lamp ② bicycle ③ clock ④ book

❷ He writes with a _____pen on paper.

① chalk ② stick ③ ink ④ fountain

⑭ We do not go to school on_____

① Saturday ② Wednesday ③ Friday ④ Monday

⑭ He takes his_____before he goes to school.

① breakfast ② lunch ③ picnic ④ supper

⑮ Columbus_____America.

① invented ② went ③ created ④ discovered

⑯ _____is the way out.

① entrance ② sigh ③ exit ④ exile

⑰ Hé buys meat and fruit in the_____.

① movies ② market ③ school ④ post office

⑱ The opposite of "lend" is_____.

① give ② buy ③ look ④ borrow

⑲ _____, people did not live in houses as we do.

① A few days ago. ② Long, long ago

③ Again and again ④ Now and then

⑳ The sun rises in_____.

① east ② the east ③ south-east ④ north-east

㉑ _____is good to eat.

① Stone ② Coal ③ Gas ④ Cloth

㉒ I like to play_____with my friends.

① water ② watch ③ pin ④ knife

㉓ My country is_____.

① the Yellow River ② the Republic of China

③ the United States of America ④ the Philippine Islands

㉔ _____is one of the most important materials for making clothes.

① Wood ② Iron ③ Cotton ④ Machine

㉕ I drink_____of tea.

① apiece ② a kind ③ a cup ④ a grain

㉖ My brother likes to play with_____.

① my sister ② a book ③ the bowl ④ the pin

㉗ We like to_____about our school.

① say ② tell ③ speak ④ talk

㉘ Can you see_____birds on the tree?

① few ② some ③ any ④ none

㉙ On each side of the head there is one_____.

① ear ② eye ③ hand ④ foot

㉚ The ninth month of the year is_____.

① November ② October ③ August ④ December

㉛ My father is always_____of studying.

① willing ② love ③ like ④ interesting

㉒ I sit in a_____.
① desk ② tree ③ chair ④ floor

㉓ Five and seven are_____.
① thirty ② twelve ③ nine ④ fourteen

㉔ I have two hands; one is the right hand and the other is the_____.
① lift ② left ③ front ④ behind

㉕ Tom is going to put his letter into the_____.
① letter-box ② toy-box ③ ticket-box ④ book-case

㉖ Four time eleven is_____.
① twenty ② fifteen ③ forty-five ④ four hundred

㉗ We Chinese eat with_____.
① chopsticks ② pencils ③ poles ④ saucer

㉘ I take three_____a day.
① dinner ② meals ③ rices ④ food

㉙ I have my hair cut at the_____shop.
① butchers' ② barber's ③ baker's ④ woodcutter's

㉚ _____don't you go to school on Sunday ?
① What ② Where ③ Why ④ How

㉛ She_____newspaper every day.
① has read ② reads ③ read ④ is reading

㉜ My aunt_____him English.
① was teaching ② has been teaching
③ are teaching ④ is teaching

㉝ _____ he get up early in the morning ?
① Do ② Has ③ Does ④ Don't

㉞ The train_____the station ten minutes ago.
① was leaving ② will be leaving ③ has left ④ left

㉟ Can you_____a picture like this ?
① drawing ② to draw ③ drew ④ drawn

㊱ They_____in this scool for three years.
① had been ② have been ③ has been ④ have to be

㊲ Each of the girls_____a pen.
① had had ② have ③ has ④ had

㊳ Tom with Paul_____in the garden.
① is ② are ③ be ④ being

㊴ The desk is_____by the carpenter.
① make ② makes ③ making ④ made

㊵ The old man_____too much wine.
① has drink ② have drank ③ had drink ④ has drunk

㊶ He always gets_____the bus at the station.
① at ② after ③ on ④ by

42 _____first he did not like to eat tomato.
① at ② after ③ on ④ by

43 Last night several friends called_____us.
① at ② after ③ on ④ by

44 Is John _____the room?
① about ② in ③ into ④ for

45 The traveler went_____boat.
① over ② by ③ on ④ at

46 I have not seen her_____ last week.
① from ② till ③ since ④ after

47 John took_____his hat as he entered the room.
① off ② of ③ from ④ on

48 He is good_____mathematics.
① in ② at ③ of ④ into

49 It is impossible_____him to steal your watch.
① for ② to ③ of ④ with

50 He is thinking _____ his parents.
① between ② among ③ of ④ in

51 My grandfather is_____old man.
① a ② an ③ the ④ such

52 Iron is_____than gold.
① usefuller ② useful ③ most useful ④ use

53 He has_____baby.
① an one year-old ② one-year-old
③ the one-year-old ④ a one-year-old

54 He is the best man_____I have ever seen.
① as ② who ③ whose ④ that

55 I made the boy_ _____.
① happy ② happily ③ happyly ④ hapyly

56 I don't know_____he will come or not.
① that ② when ③ whether ④ why

57 John is_____ tall as Jack.
① so ② such ③ as ④ same

58 _____you or I am Chinese.
① Neither ② Any ③ None ④ Each

59 One should love_____country.
① his ② her ③ one's ④ their

60 _____you and he are students in this school.
① Bath ② Both ③ Those ④ Either

61 These oranges taste_____.
① sweet ② sweetly ③ much sweet ④ more sweet

62 This flower is_____beautiful than that.
① very ② much ③ more ④ most

63 I feel the earth_____.
① to move ② to be moved ③ move ④ moved

64 _____very well?
① Can he sings ② Can he sing
③ Does he can sing ④ Does he can sings

65 Mary Chiang_____to school today.
① do not go ② does not go ③ not go ④ goes not

66 He is_____older than my uncle.
① very ② more ③ most ④ much

67 Where_____?
① you are going ② are you going
③ are going you ④ going are you

68 He_____me some books.
① given ② give ③ shall be given ④ gave

69 There_____four in the class.
① is ② was ③ has been ④ are

70 He went_____.
① upstairs ② downstair ③ upstair ④ up stairs

71 「鹿」相當於英文的
① dear ② deer ③ deal ④ daer

72 「困難的」相當於英文的
① difikult ② difficult ③ defficult ④ dificult

73 「勤勉的」相當於英文的
① dilligent ② dillegint ③ dilegint ④ deligent

74 「二月」相當於英文的
① Februry ② Fabruary ③ Febuary ④ Februay

75 「糖」相當於英文的
① sager ② suger ③ sagar ④ sugar

76 「梨」相當於英文的
① peer ② paer ③ peir ④ pair

77 「科學」相當於英文的
① sciense ② since ③ science ④ cience

78 「星期四」相當於英文的
① Thersday ② Thusday ③ Thursday ④ Thirsday

79 「忍耐」相當於英文的
① patience ② pateince ③ patiense ④ patiencee

80 「汽船」相當於英文的
① steamboot ② steamboat ③ steemboat ④ staemboat

81 It is cold in_____.

① summer ② spring ③ autumn ④ winter

82 The spring months are March, April and_____.
① August ② June ③ October ④ November

83 A cow is a very big_____.
① fox ② fish ③ animal ④ beast

84 My pencil is long but his is_____.
① strong ② strange ③ black ④ short

85 There are_____hours in a day.
① thirty-six ② twenty-four ③ eleven ④ forty-eight

86 The pool is not deep. It is_____.
① shallow ② empty ③ vacant ④ full

87 _____is a good exercise in summer.
① Climbing ② Smoking ③ Sleeping ④ Swimming

88 Wednesday comes after_____.
① Sunday ② Friday ③ Monday ④ Saturday

89 A crane is a kind of_____.
① man ② baby ③ hunter ④ bird

90 A room used for cooking is called_____.
① kitchen ② kitten ③ kitty ④ kite

91 The third day of the week is_____.
① Friday ② Sunday ③ Wednesday ④ Saturday

92 My father's mother is my_____.
① grandfather ② uncle ③ aunt ④ grand mother

93 _____comes on the 25th of December.
① New Year's day ② Christmas
③ Mother's Day ④ Teacher's Day

94 The ruler is the_____ of the three.
① long ② longer ③ longest ④ most long

95 The day on which I was born is called my_____.
① Saturday ② birthday ③ holiday ④ Monday

96 It is_____to play in the street.
① danger ② dangler ③ dangerous ④ dangle

97 The city hospital has many doctors and_____.
① teachers ② nurses ③ school boys ④ policemen

98 The new dress cost me one hundred_____.
① doctor ② dollars ③ money ④ coin

99 My father goes to his_____everyday.
① country ② beach ③ office ④ station

100 This box is_____than that.
① beautiful ② pretty ③ prettiest ④ prettier

101 _____is the mother of success.

① Hard ② Failure ③ Work ④ Carelessness

102 His friends gave him_____on his birthday.
① presents ② park ③ wine ④ store

103 Each hand_____four fingers and one thumb.
① have ② had ③ having ④ has

104 The farmer is_____a field.
① walking ② studying ③ plowing ④ drawing

105 Don't tell me those_____stories.
① interested ② tiresome ③ better ④ less

106 A place where sick people are taken is called a_____.
① market ② hospital ③ garden ④ castle

107 Prevention is better than_____.
① accuse ② cure ③ care ④ case

108 Many diseases are caused by _____.
① germs ② gems ③ guns ④ sickness

109 The man who repairs decayed teeth is called _____.
① nurse ② principal ③ dentist ④ teacher

110 When we eat, food goes down into the_____.
① stomach ② mouth ③ lungs ④ nose

111 I_____study.
① am like ② am like to ③ very like ④ like

112 Such a thing might_____at any time.
① happened ② happens ③ happen ④ happening

113 We_____lose the game if we do not practise.
① will ② shall ③ have ④ had

114 The wind_____now.
① blow ② blowing ③ has blown ④ is blowing

115 He was writing a letter when you_____.
① arrive ② arrives ③ arrived ④ will arrive

116 You ought_____hard.
① study ② to study ③ to studies ④ studies

117 John_____as he was crossing the street.
① felt ② feel ③ fall ④ fell

118 He_____visit up many times.
① had ② have ③ has ④ has been

119 The bridge _____ by the end of this year.
① biulds ② will biuld ③ will have built
④ will have been built

120 I_____well last night.
① sleep ② was sleeping ③ am sleeping ④ had stept

121 The book was sold_____ a good price.

① from ② at ③ for ④ since

(122) They go_____school at eight o'clock.
① during ② to ③ from ④ off

(123) We do not study much_____summer.
① in ② on ③ at ④ over

(124) I am sorry_____your mistakes.
① of ② for ③ to ④ in

(125) Take care_____your health.
① of ② for ③ to ④ in

(126) I put_____my hat.
① in ② to ③ since ④ from

(127) I cannot agree_____your proposal.
① of ② to ③ since ④ from

(128) They laughed_____me.
① to ② for ③ in ④ from

(129) He took_____his coat.
① of ② off ③ at ④ to

(130) You should pay attention_____your lessons.
① in ② into ③ to ④ out of

(131) John is absent from school, because he has_____.
① a cold ② a sick ③ a ill ④ illness

(132) _____is that old gentleman?
① Whom ② Who ③ Whose ④ Which

(133) It was a_____day.
① rain ② rained ③ raining ④ rainy

(134) All the students are_____happy.
① much ② more ③ great ④ very

(135) It tastes_____.
① well ② much well ③ good ④ much good

(136) My room is larger than_____.
① you ② your ③ your's ④ yours

(137) I am_____in the dark.
① fear ② afraid ③ fight ④ find

(138) The clock is out of_____.
① odor ② odour ③ order ④ odorous

(139) Do you like to live in Taiwan? Yes, I_____.
① am ② was ③ do ④ did

(140) Were you_____yesterday?
① busy ② business ③ busily ④ bushy

(141) This desk is_____than the table.
① heavy ② heavily ③ heavier ④ heaviest

⑫ I visited him in America several years_____.
① age ② ago ③ tomorrow ④ next year

⑬ _____were many people present at the meeting.
① It ② There ③ Their ④ These

⑭ Mary_____that she was very well yesterday.
① says ② said ③ tells ④ told

⑮ He_____me that you were no longer studying English.
① says ② said ③ tells ④ told

⑯ He was here at three o'clock,_____he?
① doesn't ② didn't ③ isn't ④ weren't

⑰ We shall have our test_____week.
① in next ② next ③ on next ④ of next

⑱ In_____, we won the game.
① short ② shorter ③ shorest ④ the short

⑲ That question, no_____, is hard to answer.
① double ② the doubt ③ doubt ④ the doubt

⑳ _____me in.
① Late ② Let ③ Let's ④ It's

## 省立臺北商業職業學校

I Fill in the blanks : (每題一分)

❶ The bookstore is……the bank and the theater.
❷ He is looking……his pen.
❸ I want to find……who telephoned to me.
❹ Miss Chang……English very well.
❺ I have very……work to do today.
❻ He always comes to class……time.
❼ I usually come to school……bus.
❽ I will be in Taiwan……three days.
❾ The lamp is……the desk.
❿ He gave the money……his son.
⓫ His birthday is……June 4 (fourth).
⓬ His birthday is……June.
⓭ There……twelve months in a year.
⓮ The girl……was here is my sister.
⓯ There……a big map on the wall.
⓰ ……much light enters this room.
⓱ There is……time like the present.
⓲ ……you in class yesterday?
⓳ Do you take sugar……your coffee?

⑳ The book……I bought is a good one.

Ⅱ Fill in the blanks with the correct tense of the verb in the parentheses: (每題二分)

❶ They told me that he……(leave).
(Example : They told me that he had left.)
❷ She told me she……(know) him for many years.
❸ I knew that he……(tell me a lie.
❹ They……(live) here for ten years.
❺ I……(sleep) when you telephoned.
❻ When we got there, John……(read) the newspaper as usual.
❼ I……(sleep) well last night.
❽ We……(eat) when they arrived. ❾ It……(rain) when I left.
❿ It began to rain while I……(wait) for the bus.
⓫ The wind……(blow) hard now.
⓬ I……(see) Mr. Pan yesterday.
⓭ I……(study) English when I was in middle school.
⓮ I……(write) a letter last night.
⓯ He……(be) in Hongkong many times.
⓰ Yes, I……(read) it a month ago.
⓱ He……(travel) by boat several times.
⓲ He……(work) there since last June.
⓳ My sister……(be) sick last winter.
⓴ I……(write) a letter last night when they came.
㉑ Mary……(go) to see the doctor when I met her.

Ⅲ Change the followings into negative sentences : (每題二分)

❶ He likes to study.
(Example : He does not like to study.)
❷ She is busy. ❸ John went to Japan.
❹ He has some money. ❺ John shut the window.
❻ This room is large. ❼ He lives by himself.
❽ She sings well. ❾ She cut herself.
❿ James can speak French well.
⓫ She goes to school every day.

Ⅳ Make Sentences : (每題四分)

❶ desk ❷ village ❸ handsome ❹ welcome ❺ shake

## 臺北市私立靜修女子中學

1. Give the opposite of: 10% example: (good-bad)

long_____enemy_____early_____go_____failure_____
wet_____gain_____safe_____remember_____different_____

2. Give the past and participle of: 20% example; (bring brought brought)

| present | past | past participle | present | past | past participle |
|---|---|---|---|---|---|
| give | | | run | | |
| sing | | | drink | | |
| thank | | | catch | | |
| sit | | | teach | | |
| meet | | | see | | |

3. Give the plural number of: 10% example: (party-parties)

boy_____ country_____ house_____ fly_____ roof_____
mouse_____ leaf_____ sheep_____ piano_____ tooth_____

4. Give the comparative and superlative: 20% example: (big-bigger-biggest)

| | | | | | |
|---|---|---|---|---|---|
| small | | | large | | |
| happy | | | fat | | |
| hot | | | good | | |
| late | | | many | | |
| useless | | | important | | |

5. Correct the errors: 10% example: I eat many rice. (much)

❶ every student knows English. ..... ( )
❷ She is taller than me. ..... ( )
❸ Iron is an useful metal. ..... ( )
❹ We fond of this book. ..... ( )
❺ She is beautiful than her sister. ..... ( )
❻ The letter gives me many pain. ..... ( )
❼ Whom is your father? ..... ( )
❽ Animals love they's young ones. ..... ( )
❾ She see me last night. ..... ( )
❿ The two students help one another. ..... ( )

6. Vocabularies: 10%

fireman _____ elevator _____ society _____ wrist _____ professor _____
地球_____ 醫生_____ 饑餓_____ 收穫_____ 甘蔗_____

7. Choose the right words for the blanks: 10% example: She is sewing her dress. (sewing, eating, writing)

❶ I like to play_____. (book, sing, tennis)
❷ The Bible teaches all men to_____God. (sing, love, see)
❸ _____is hotter than winter. (spring, Sunday, December)
❹ We_____much water in summer. (eat, drink, buy)
❺ My father_____me a new dress. (makes, draws, buys)
❻ We do not go to school on_____. (January, summer, Sunday)
❼ China is the biggest_____in the world. (country, land, island)
❽ We_____English in our school. (think, learn, say)
❾ Columbus_____America. (made, built, discovered)

⑩ The moon_____at night. (shines, brights, comes)

8. Change the voices: 10%

❶ He eats an apple.
❷ The child was seen by the man.
❸ I painted the picture.
❹ The window is opened by you.
❺ The cat kills the rat.

## 臺北市私立開南商工職業學校

I Select the proper one among four spellings to each Chinese word.(20%)

| | | ① | ② | ③ | ④ | |
|---|---|---|---|---|---|---|
| Ex. | (例) | | | | | |
| | 老 師 | teacher | teecher | teachar | teechar…… | (①) |
| ❶ | 椅 子 | cheir | chear | chair | chiar…… | ( ) |
| ❷ | 早 晨 | moaning | morning | moring | moning …… | ( ) |
| ❸ | 星期六 | Sertaday | Saterday | Suterday | Saturday …… | ( ) |
| ❹ | 十 一 | ileven | eleven | elevn | elven…… | ( ) |
| ❺ | 學 生 | student | studint | studant | studont…… | ( ) |
| ❻ | 九 月 | Septenber | Septenbor | September | Septembor … | ( ) |
| ❼ | 聽 | heer | here | haer | hear …… | ( ) |
| ❽ | 黑 板 | blackbord | blackboard | blackbord | blakboard…… | ( ) |
| ❾ | 第 八 | eight | eightth | aighth | eighth …… | ( ) |
| ❿ | 星期三 | Wedsday | Wensday | Wednesday | Wedesday…… | ( ) |

II Correct the mistakes in the follows (20%) 改錯

are
×
Ex. You is a boy.

❶ I have two hand.
❷ April comes before March.
❸ The sun rise in east.
❹ She came by foot.
❺ How many milk do you take a day?
❻ I have any money in my pocket.
❼ He go to the city once a week.
❽ This is a old book.
❾ You and I am all Chinese.
❿ Let we see it.

III Rearrange the following words to complete a sentence. (20%) 重組

Ex. is, a, this, book._____This is a book.

❶ name, what, your, is?
❷ is, where, book, my?
❸ two, see, we, can, doors.
❹ I, the, desk, behind, stand.
❺ are, going, they, America, to, plane, by.

IV Fill the blanks with the proper words in the follows (20%) 填充

❶ _____hat is this?
❷ One_____is truthful can be trusted.
❸ There_____many teachers in my school.
❹ Why_____you laugh at me?

V Translate the following Chinese into English (20%) 中譯英

❶ 太陽比月亮大得很多。 ❷ 本學年的第二學期開始了。

❸ 每天早晨七時半我到學校去。

❹ 我每天從基隆 (Kee-lung) 乘火車去臺北 (Taipei)。

## 省立基隆中學

I Change each of the following into question form : (10%)

❶ John will come to school tomorrow.

❷ February is the second month of the year.

❸ He has gone out of town.

❹ The boy left his book at home.

❺ It took them a long time to finish the work.

II Change each of the following into negative form : (10%)

❶ John studies very hard. ❷ They need a fan in their room.

❸ She gave him the book. ❹ We went to the movies last night.

❺ I found my copy-book.

III Change each of the following from the active to passive form : (10%)

❶ The hunter killed the tiger. ❷ The teacher told us the story.

❸ He has just finished the report.

❹ They are examining the new students now.

❺ The boys were looking at the soldiers.

IV Fill in the blanks : (20%)

❶ My sister reached home long before I_____.

❷ _____ of the two girls is your sister?

❸ Don't laugh_____him.

❹ That is the house_____which I live.

❺ The desk is made_____wood.

❻ I wish I_____a bird. ❼ _____book is this?

❽ A cat is_____useful animal.

❾ You no less than he_____diligent.

❿ Either you or he_____wrong.

V Correct the errors : (20%)

❶ I afraid of him.

❷ There have many students in the classroom.

❸ I very glad to see you. ❹ He today not go.

❺ You go to where? I am going to home.

❻ Every man and woman are at work.

❼ You will not be here, do you?

❽ You can tell him that, don't you?

❾ Five dollars are not enough.

❿ I has written a letter last evening.

VI Translate the following into English: (30%)

❶ 我比弟弟大兩歲。
❷ 這汽車是到火車站的。
❸ 我每晚十時睡覺。
❹ 請把你的脚踏車借給我。
❺ 我發覺他在他的坐位上睡覺。

## 省立基隆女子中學

A. Give the plural form and the Chinese equivalent of the following words: (10%)

❶ dish ❷ church ❸ baby ❹ piano ❺ child
❻ knife ❼ mouse ❽ volcano ❾ sheep ❿ tooth

B. Give the past and the past participle of each of the following verbs: (10%)

| | Present | Past | Past participle | | Present | Past | Past participle |
|---|---|---|---|---|---|---|---|
| ❶ | take | | | ❷ | stop | | |
| ❸ | put | | | ❹ | stay | | |
| ❺ | study | | | ❻ | lay | | |
| ❼ | break | | | ❽ | eat | | |
| ❾ | forget | | | ❿ | swim | | |

C. Cross out the wrong word within the parentheses: (10%)

❶ There is plenty of (room, rooms).
❷ He sleeps (when, whenever) he can.
❸ Some wines are made (of, from) rice.
❹ They reached home long before I (do, did).
❺ I do not know what (happy, happiness) is.
❻ The tiger is (more, much) bigger than the cat.
❼ He is older than (I, me).
❽ It has rained too (many, much).
❾ You (would, should) work harder this year.
❿ It is she (who, whom) I like most.

D. Correct the errors: (15%)

❶ He is a proudest man I ever saw.
❷ Were their mother at their home?
❸ I could not but to laugh.
❹ The trick played many times.
❺ I know where is he.
❻ You are stand on my feet.
❼ The son very much like his father.
❽ He needs not come on Sundays.
❾ You may see him to reading all the time.
❿ A few days latter, he did the same thing again.

E. Fill in the following blanks: (10%)

❶ The two boys are_____the same size.
❷ I mistake that boy_____my brother.
❸ He is_____need of money.
❹ China is our_____land.
❺ In my opinion, this is quite_____right.
❻ There are few places_____I have not gone.
❼ If you feel blue,_____for a walk.
❽ He_____given up all hope of success.
❾ We satisfy_____hunger with bread and milk.
❿ From this spot you_____see the ocean.

F. Change the following sentences from the active form to the passive form and vice versa: (15%)
❶ The child was bitten by the dog.
❷ The money has been stolen by a thief.
❸ Who wrote this story?
❹ Too much eating will hurt our health.
❺ I am reviewing my lessons for the coming examination.

G. Make sentences, each containing one of the following words or phrases:
❶ unless ❷ in front of ❸ a man who (15%)
❹ as warm as ❺ against

H. Translate the following into English: (15%)
❶ 我太疲倦不能工作。 ❷ 只要我們活着就有希望。
❸ 這件事如此難恐怕不能做好。 ❹ 倘若我們不健康就沒有眞正快樂。
❺ 她每星期天下午到我家來談天。

## 省立基隆水產職業學校

I Explain the following phrases and words in Chinese: 20%
❶ by and by ❷ give up ❸ a great deal ❹ all the year round
❺ agree with ❻ correspond to ❼ make it out ❽ look up to
❾ go on ❿ of course ❶ freedom ❷ education
❸ picnic ❹ faithful ❺ science ❻ accompany
❼ vibration ❽ music ❾ pleasure ❿ cottage

II Give each of the following verbs its past tense form and participle form: 20%
❶ bring___ ___ ❷ begin___ ___ ❸ do ___ ___
❹ put ___ ___ ❺ make___ ___ ❻ lie ___ ___
❼ talk ___ ___ ❽ come___ ___ ❾ read___ ___
❿ go ___ ___

III Correct the errors: 20%
❶ I don't know whether it is true and not.
❷ How much students are here in your school?

❸ He can not writing, but he can read.
❹ I use a umbrella when it rains.
❺ Who give you the ticket?
❻ A man whom work in the field is call a farmer.
❼ You have better give up your plan.
❽ We go to school for feet every day. ❾ I am old than you.
❿ When do you got up every day?

Ⅳ Choose the proper word in the parenthesis : 20%
❶ He should like (to go, go)
❷ We are hunting (to, for) the lion.
❸ He may be (hids, hiding) in the cave.
❹ We have (fight, fought) many battles.
❺ He did not (looked, look) in.
❻ Don't hide (from, at) us. ❼ He looks (happily, happy)
❽ He is (ready, readily). ❾ Wait (moment, a moment).
❿ I am very (glad, gladly) to see you.

Ⅴ Answer the following questions : 20%
❶ How old are you and where do you live?
❷ Why do you come to our school?
❸ Do you like to study English? If so, why?
❹ Which subject do you like best?
❺ How long have you been living in Taiwan?

## 省立宜蘭中學

Ⅰ Transcribe the following sentences into phonetic symbols : 10%
In winter the weather is told. In the North it snows. When the snow falls, everything looks white and beautiful.

Ⅱ Give English equivalents to the following Chinese: 10%
a. 祖國 b. 自由 c. 榮譽 d. 自由世界 e. 共匪集團

Ⅲ Translate the following sentences into English: 20%
❶ 她每天彈鋼琴 (use play) ❷ 他說「我要買本新書」。
❸ 他叫我等他。 ❹ 他給我一本書，我付他十元。
❺ 我希望你明天能來。

Ⅳ Pick out the part of speech to which each underlined word belongs : 20%
❶ It is cheap for I bought it cheap. a. b.
❷ A silk gown is made of silk. a. b.
❸ Let the dog bark, its bark will hurt no one. a. b.
❹ Leather shoes are made of leather. a. b.
❺ He only had a son and he lost his only son. a. b.

V Correct errors: 20%

❶ The sun rose in the morning. ❷ He has eat his food.
❸ He speaks to me yesterday. ❹ Waited here until I come back.
❺ They done their best.

VI Rewrite the following sentences, changing the verbs in the active voice to the passive, and those in the passive to the active: 20%

❶ The story has been told me. ❷ The first cup was left empty.
❸ He asked me a question. ❹ The child was bitten by the dog.
❺ We studied a history of France.

## 省立蘭陽女子中學

I Choose the right word in the parentheses: (14%)

❶ I have never met any one who had (everything, anything) he wanted.
❷ We think too (much, many) about things we haven't.
❸ Brush your teeth (in, at) night and (at, in) the morning.
❹ This desk is made (of, from) wood.
❺ Man is a (curiosity, curious) animal.
❻ I feel very (bad, badly) this morning.
❼ To (who, whom) are you sending these books?

II Fill in the blanks: (16%)

❶ The fly is one of the most_____enemies of man.
❷ Is your mother_____home?
❸ I put_____my clothes.
❹ Silence is_____in strained situations.
❺ Work hard_____you will succeed.
❻ He obeyed his parents without a_____.
❼ Respect each_____of the family.
❽ I meet a girl_____is your sister.

III Correct the errors: (15%)

❶ He said that he was mistake. ❷ You need lot of sleep.
❸ There are two thousands students in this school.
❹ We all live in the earth.
❺ Sugar cane likes Indian corn as it grows.
❻ Now he no more envies the birds. ❼ I want to buy a best pen.
❽ She go to school every day. ❾ You learn English easy.
❿ Things have going smoothly. ⓫ Can I help you?
⓬ He have two books. ⓭ It only goes 50 foot deeper.
⓮ He is a fool man. ⓯ I see him yesterday.

IV Give the past and past participle of the following verbs: (12%)

❶ catch, _____, _____, ❷ eat, _____, _____,
❸ think, _____, _____, ❹ give, _____, _____,

❺ write, _____, _____, ❻ put, _____, _____,

V Make sentences with the following words or phrases : (15%)

❶ in company with : ❷ discover : ❸ duty :

❹ in fact : ❺ wet :

VI Change the voices in the following sentences : (10%)

❶ The rats were caught by the cat. ❷ I see my brother.

❸ You can see it. ❹ I gave you a book.

❺ America was discovered by Columbus.

VII Answer the following questions : (10%)

❶ What bridge is the longest in the world?

❷ How many years have you studied English?

❸ Who is the president of China?

❹ Have you ever seen a tiger?

❺ When a fire gets started, is it necessary to bring it under control quickly.

VIII Tell each part of speech in the following sentences : (8%)

Both John and you are very good students.

## 省立宜蘭農業職業學校

I Copy the following letters by word :

❶ IAMACHINESE. ❷ TAIWANISAPARTOFCHINA.

❸ SUMMERVACATIONBEGINSATJULY.

❹ TODAYISMONDAY. ❺ ATEACHERTEACHESUSENGLISH.

II Arrange the following words into a sentences :

❶ on he chair sits a. ❷ my fingers have I five left on hand.

❸ student a is a who boy studies.

❹ not English my is spoken language.

❺ sings she well very in class the.

III Write "Yes" or "No" in the parentheses :

❶ Chinese is a language of U.S.A. ..... ( )

❷ English is spoken in the United States. ..... ( )

❸ The sun rises in the south and sets in the east. ..... ( )

❹ We, Chinese students, hate the Communists. ..... ( )

❺ She reads her book with her ears. ..... ( )

❻ The word "parents" means boys and girls. ..... ( )

❼ Yi-lan is a county in Taiwan. ..... ( )

❽ Taiwan is not a part of America. ..... ( )

❾ We celebrate The Double Tenth in August. ..... ( )

❿ I walk with my hands and work with my feet. ..... ( )

IV Correct the errors :

❶ The sun was bugger than the earth.

❷ People ought to visits the dentist twice a year.
❸ After his mother died, he goes out once more.
❹ He arrived of the church.
❺ He become the leader of these men.
❻ His uncle took care at him.
❼ There had some men like himself who had been badly treated.
❽ I did not wrote the letter.
❾ See what a nice cord this are!
❿ That is just what I have wanted.

V Fill the blanks with suitable words:

❶ _____do you want?
❷ A man_____has a beard is a bearded man.
❸ I_____a book, and it_____to me.
❹ I have a friend_____house near yours.
❺ I crossed_____a bridge this morning.
❻ He_____home and went_____bed.
❼ I_____to him, "This is my book."
❽ He_____me a story. ❾ Please, _____me some water.
❿ _____did you see him?

## 省立桃園中學

I Read the following paragraph and answer the questions given below.: (20%)

The common house fly is one of the most dangerous enemies of man. It is dangerous beeause it carries disease. The fly can be seen almost any warm day flying round any house. It does not care whether its food is dirty or clean. The food it likes best is often the dirtiest that can be found. Whenever you see flies in a house, kill them at once. By doing so you may save someone's life.

❶ Do you think the fly is a friend of man?
❷ Why is it dangerous? ❸ Where can the fly be seen?
❹ What kind of food does it like best?
❺ What should you do whenever you see flies in a house?

I Correct the following sentences: (20%)

❶ My friend can speaks English fluently.
❷ He did not went to Taipei very often.
❸ My teacher said I have done my work very well.
❹ My sister told I many interesting things.
❺ We have bought a two-stories building.
❻ This book is writing in simple English.
❼ He is not polite, so I don't like he.

❽ They are taken dinner now.
❾ Tea is make from the leaves of a plant.
❿ Wash your hands before eat.

Ⅲ Explain the following terms in Chinese : (20%)

❶ language ❷ silence ❸ honor ❹ experience
❺ reason ❻ vegetable ❼ blood ❽ hospital
❾ nerve ❿ responsibility ⓫ sweet drinks ⓬ cold bath
⓭ freedom of thought ⓮ good manners
⓯ summer vacation ⓰ a square mile
⓱ Pacific Ocean ⓲ a man of ability
⓳ the surface of the earth ⓴ three thousand feet below the ground

Ⅳ Complete the following sentences : (20%)

❶ _____ _____ _____ _____ _____ _____is our duty.
❷ Let me_____ _____ _____ _____ _____
❸ He will not_____ _____ _____ _____ _____ _____
❹ You must_____ _____ _____ _____ _____ _____ _____ _____
❺ My father is too_____ _____ _____to_____ _____ _____
❻ He is no longer_____ _____ _____ _____ _____ _____
❼ You are more_____ _____ _____than_____ _____ _____
❽ The more_____ _____ _____ _____the more_____ _____ _____ _____
❾ I_____ _____ _____ _____ _____slowly and carefully.
❿ What did you_____ _____ _____ _____ _____ _____ _____ _____?

Ⅴ Give the past and past participle forms of the following verbs :

❶ sit ❷ put ❸ catch ❹ discover ❺ am
❻ have ❼ become ❽ hear ❾ sleep ❿ know

## 省立桃園農業職業學校

A. If the idea is correct, put "+" in the parentheses; if it is not correct, put "—" in the parentheses:

Example: There are four seasons in a year ..... (+)
Three and four are eight ..... (—)

❶ The sun goes down in the evening ..... ( )
❷ A dining-room is a room where we sleep ..... ( )
❸ Taiwan is a part of China ..... ( )
❹ A bicycle has flour wheels ..... ( )
❺ We, Chinese, do not eat with knife and fork, but with chopsticks. ..... ( )
❻ Dogs do not eat hay ..... ( )
❼ An elephant is much smaller than a fox ..... ( )
❽ We clean our clothes by washing them ..... ( )
❾ A tailor is a man who makes desks, chairs, etc ..... ( )

⑩ Idle boys are sure to be promoted ..... ( )

B. Choose the correct word in the parentheses.

Example: I walk with my (fingers, eyes, feet, head).

❶ We often put some (flowers, candles, meat, fire-crackers) on a birthday cake.

❷ Cocks and hens often dig in the earth for (worms, eggs, jewels, sand).

❸ When we want to see the time we look at a (compass, calendar, radio, clock).

❹ Your mother's sister is your (cousin, niece, aunt, mother-in-law).

❺ A zoo is a place where there is a large collection of (animals, books, plants, paintings).

❻ When the sun is (near, close to, behind, above) the clouds, we cannot see it.

❼ You brush your teeth with (soap and water, a comb, an eraser, a toothbrush).

❽ In the evening we have our (lunch, breakfast, supper, tea).

❾ When we want to send off a letter, we go to the (post office, railway station, hospital, police station).

❿ Shirts are made of (steel, cement, paper, cotton).

C. Underline the error and put your correction in the parentheses.

Example: Will you wait me after class? (wait for me)

❶ Have you see the monkeys? ( )

❷ He runs faster than you and me. ( )

❸ I not sleep well at night. ( )

❹ Tom is wise than his brother. ( )

❺ The teacher will teach us if us don't know. ( )

❻ July and August is warm months. ( )

❼ Who will you go to the party with? ( )

❽ Either he or you is mistaken. ( )

❾ I do not like live in the city. ( )

❿ If it will rain, shall we stay at home? ( )

D. Fill in the blanks with the present, past, or present perfect tense, as required, of the verbs in parentheses.

Example: He gets (get) up at seven o'clock every day.

❶ He_____(get) up at six o'clock this morning.

❷ The sun_____(rise) in the east.

❸ We_____(go) to the zoo yesterday.

❹ It_____(rain) quite a lot this week.

❺ I_____(study) English for three years.

❻ There_____(be) seven days in a week.

❼ The doorbell_____(ring) very often.
❽ A full moon_____(look) like a ball.
❾ We_____(have) a picnic yesterday afternoon.
❿ I_____(be) in Tainan twice.

## 省立新竹中學

I Translate the following two passages into Chinese : (20%)

a. Not satisfied with his mastery of the earth and the ocean, man turned his attention to the conquest of the air. As he watched the birds fly above him, he wished to fly too. First he made balloons, but they were at the mercy of the wind, and man wanted something that he himself could control. So he invented airplanes, and now he no longer envies the birds. He sails the air when and where he wills.

b. Our fatherland is in danger. Citizens, to arms ! to arms ! Unless the whole nation rise up as one man to defend itself, all the noble blood already shed is in vain. People of Free China, will you die under the exterminating sword of the Russians ? If not, defend yourselves. Will you look on while the Russians tread under foot the bodies of your fathers, mothers, wives and children ? If not, defend yourselves.

I Make sentences with the given words and phrases : (20%)

❶ seen : ❷ used to : ❸ the……the…… : ❹ as well as :
❺ though : ❻ look for : ❼ by means of : ❽ so……as… :
❾ since : ❿ than :

I Fill the blanks with appropriate words or phrases : (20%)

❶ He will come_____next Monday.
❷ Our teacher told us that _____earth is round.
❸ This is the book_____I bought yesterday.
❹ I like swimming_____the evening.
❺ I see Mary run_____a dog.
❻ The bad weather prevented them from_____.
❼ My brother wishes _____see you again.
❽ Whom_____you meet yesterday.
❾ Those letters _____written by my father.
❿ Work hard_____you will fail.

IV Correct the errors in the following sentences : (10%)

❶ China is one of the countries in the Asia.
❷ It is best of all. ❸ I am writing a letter when he comes in.
❹ If I was you I would not go. ❺ He dare not to speak loudly.
❻ The book on the table belong to my friend.

❼ You should not comes late.
❽ Every child very loves his mother.
❾ I can read neither English or Chinese.
❿ My father is very busily everyday.

Ⅴ Give the equivalents about the following words and phrases: (10%)
❶ 數學 ❷ 星期四 ❸ 奮鬪 ❹ 肥沃的 ❺ 同胞
❻ 恭敬 ❼ 阻止 ❽ 學問 ❾ 突然的 ❿ 社會

Ⅵ Translate the following into English: (20%)
❶ 你爲什麼要來這個學校？ ❷ 十月十日是中國的國慶日。
❸ 我們學校沒有女生。 ❹ 因爲下雨我們不能去了。
❺ 你願意和我去游泳嗎？

## 省立新竹女子中學

A. Explain the following words and phrases: (20%)

| | | |
|---|---|---|
| ❶ look after | ❷ to arms | ❸ by the way |
| ❹ a great deal of | ❺ take hold of | ❻ in case of |
| ❼ in search of | ❽ to get rid of | ❾ carry out |
| ❿ in order to | ⓫ liberty | ⓬ advertisement |
| ⓭ fine-looking | ⓮ overwork | ⓯ merchant |
| ⓰ graduate | ⓱ independent | ⓲ waste |
| ⓳ normal | ⓴ invitation | |

B. Correct the errors in the following sentences: (20%)
❶ My brother has planted this tree ten years ago.
❷ I have an interested book.
❸ There is few people who do not like music.
❹ He work hard so that he can succeed.
❺ He could wrote as well as you.
❻ I saw the boy hide behind a tree.
❼ He is a American but I am a Englishman.
❽ Anybody has taken my knife.
❾ They said that they are very glad to see me.
❿ Mr. Chen, my teacher, who is a very clever man.

C. Fill in the blanks with proper words: (10%)
❶ Wine is made_____ grapes.
❷ You will miss the train_____ you hurry.
❸ Each of the girls_____ a pencil.
❹ Mr. Chang and I_____ friends.
❺ When do you get up_____ the morning?
❻ Where_____ all the people gone?
❼ We all come to school_____ learn.
❽ He studied_____ of all the boys.

⑨ We didn't go to the park_____Sunday.
⑩ It has been more than one month_____I saw you last time.

D. Translate the following passages into Chinese: (20%)
❶ Circling over the field, the silver ship headed south toward Thailand. The children watched until it was lost to view among the clouds.
❷ I am planning a trip to the Sun-Moon Lake with some of my friends, as I haven't been there once since I came to this island.
❸ In the morning it stopped raining for a while, but soon it began again, so I had to keep indoors all day long.
❹ Unless the whole nation rise up as one man to defend itself, all the noble blood already shed is in vain.
❺ You need not be proud of yourself because you have succeeded in the entrance examination. Neither need you be disappointed because you have failed in it.

E. Translate the following into English: (15%)
❶ 他說，"我要買一本新書"。 ❷ 倘若我是你，我要幫助她。
❸ 她每天彈鋼琴。 ❹ 我已經從初級中學畢業了。
❺ 她一聽見這事，便立刻走開。

F. Answer the following questions with complete English sentences: (15%)
❶ Is it difficult to study English? ❷ What date is it today?
❸ If anyone thanks you for anything, what should you say?
❹ What will you do for your country?
❺ What lesson do you like best in the junior middle school?

## 省立新竹工業職業學校

一、下列各字用中文註解（10%），（寫在括號內）
Workman (　) Iron (　) Engine (　) Steam (　)
Energy (　) Physics (　) Steamer (　) Motorcar (　)
Chemistry (　) Electric (　)

二 將下列中文譯成英文（寫在橫線上）：（10%）
八月_____，星期三_____，考試_____，工廠_____，
氣候_____，電話_____，鐵路_____，製造_____，
飛機_____，氧氣_____。

三 將適當的字填入下列空欄中（10%）
❶ We_____our country.
❷ I am waiting_____you.
❸ We can_____speak good English.
❹ You will become a useful man_____the future.
❺ It is easy to say things, but it is_____to do them.

四 選擇下列各句中括號內適當的字填在橫線上（10%）
❶ Tea is_____in China (grow, grown, growth).

❷ Is your bicycle_____good condition? (of, with, in)
❸ Have you_____seen a tiger? (never, ever)
❹ There are many_____words in this lesson (difficult, difficulty).
❺ You must have_____this book. (see, saw, seen)

五 試填寫下列動詞表 (10%)

| Present (現在) | Past (過去) | Past participle (過去分詞) |
|---|---|---|
| ❶ Know | _____ | _____ |
| ❷ _____ | threw | _____ |
| ❸ _____ | _____ | lain |
| ❹ _____ | brought | _____ |
| ❺ Put | _____ | _____ |

六 改正下列各句中的錯誤 (將錯字劃掉，改正的字寫在其上) (10%)

❶ He do not like me.
❷ Today is Monday and yesterday is Sunday.
❸ This is not my book; it is your.
❹ We must asleep eight hours a day.
❺ I shall try understand every words in the book.

七 用英語回答下列各問題 (20%)

❶ What are you doing now? ..... ( )
❷ Do you often study your lessons at home? ..... ( )
❸ Does he go to school in the summer? ..... ( )
❹ What did you do yesterday morning? ..... ( )
❺ How long did it take you to prepare your lesson last night? ( )

用下列字或片語 (phrase) 造句 (20%)

❶ need not (v.) ..... ( )
❷ greater (adj.) ..... ( )
❸ plenty (adv.) ..... ( )
❹ either (pron.) ..... ( )
❺ neither……nor (conj.) ..... ( )

## 省立新竹商業職業學校

I Translate the following into Chinese;

When a boy or girl has left school and looks after his or her first situation, the master or mistress at once asks, "Have you brought a good character?" A good character, then, is the first thing that everybody needs in life and everyone who has to earn a living should be very careful to avoid bad habits and bad companions, for these only give one a bad name. (20%)

II Make five sentences with the phrases below; (20%)

❶ either……or…… ❷ make of ❸ according to

❹ arrive at ❺ afraid of

Ⅱ Fill the following blanks with an appropriate word; (20%)

❶ They ( ) gone to Taipeh last week.
❷ Both you ( ) he will be punished.
❸ She is ( ) smaller than her younger sister.
❹ Your success will depend ( ) your effort.
❺ John is a general as ( ) as a scholar.
❻ The old man who ( ) sitting there is my grandfather.
❼ It rains ( ) and then in summer.
❽ Iron is the ( ) useful metal.
❾ The sun rises ( ) the morning.
❿ ( ) all, he is a good citizen.

Ⅳ Correct the errors in the following sentences; (20%)

❶ One whose works hard will succeed.
❷ He has write a letter to his father.
❸ Every student should do their own lesson.
❹ Who does he want to see?
❺ The bird sing on the tree is so beautiful.
❻ Having been wound by an arrow, the dog fell down.
❼ Is it me you wish to visit?
❽ The boys are run toward their school.
❾ My book is not so new as your.
❿ Does he go to the city yesterday?

Ⅴ Give the noun form of the following words: (10%)

❶ act ❷ poor ❸ move ❹ believe ❺ difficult
❻ brave ❼ golden ❽ combine ❾ fail ❿ choose

Ⅵ Translate the following into Chinese: (10%)

❶ 經驗 ❷ 生活 ❸ 英雄 ❹ 傷害 ❺ 相信
❻ 報紙 ❼ 成功 ❽ 記憶 ❾ 鐵路 ❿ 邀請

## 省立苗栗中學

Ⅰ Translate the following words into English and vice versa: (20%)

❶ 天花板 ❷ 馬鈴薯 ❸ 摩天樓 ❹ 短統襪
❺ 襯衫 ❻ 炸彈 ❼ 糖菓 ❽ 鋼琴
❾ 手帕 ❿ 自行車 ⓫ enemy ⓬ spinach
⓭ referee ⓮ consonant ⓯ sheet ⓰ towel
⓱ elephant ⓲ throat ⓳ ticket ⓴ platform

Ⅰ Translate the following sentences into Chinese: (15%)

❶ Go to bed with the lamb and get up with the lark.
❷ Use is better than ornament.
❸ The more the frogs jumped, the more stones the boys threw.

❹ You gave me ten dollars, and here is the fifteen cents change.
❺ Eating between meals is a bad habit.

Ⅲ Answer the following questions : (15%)
❶ When we part, what do we say?
❷ How many fingers have you?
❸ What are you looking for?
❹ Who is that man standing at the door?
❺ Do you sometimes go on a picnic?

Ⅳ Make sentences with the following phrases : (15%)
❶ as soon as ❷ instead of ❸ owing to ❹ according to ❺ ask for

Ⅴ Fill the following blanks : (10%)
❶ We have no water_____. ❷ Most students are fond of_____.
❸ He_____not know. ❹ We laughed_____the funny sight.
❺ Iron, lead and gold_____metals.
❻ My uncle is_____able man. ❼ He is tailer_____I.
❽ My book and_____are new. ❾ To-morrow_____Sunday.
❿ Either you_____he broke this cup.

Ⅵ Correct the following mistakes : (10%)
❶ The boys running down the street.
❷ Many a man do not know his ability.
❸ One of these girls are my sister. ❹ He is a old man.
❺ I, who is old, have never seen a worse storm.
❻ No one shall to go there. ❼ It not rain last night.
❽ The leaves have begin to fall. ❾ I done it myself.
❿ Bird fly from the north.

Ⅶ Change the following sentences : (15%)
A. from active voice into passive :
❶ I see a cock.
❷ He told me a story.
❸ Mary buys me two pens.
B. from passive voice into active :
❶ A cat is killed by a dog.
❷ He was punished by the teacher.
C. from declarative sentences into interrogative ones :
❶ He has three brothers.
❷ They like to play tennis.
D. from compound sentences into simple ones :
❶ He is tired and he lies down to rest.
❷ Spring comes and the day becomes long.
❸ He is sick, therefore he is absent.

## 省立苗栗農業職業學校

一 寫出下列各字的中文字義：

❶ morality ❷ photograph ❸ success ❹ victory
❺ sacrifice ❻ magazine ❼ automobile ❽ education
❾ hospital ❿ composition

二 寫出下列各動詞的過去式及過去分詞：

| | （過去式） | （過去分詞） | | （過去式） | （過去分詞） |
|---|---|---|---|---|---|
| ❶ think | _____ | _____ | ❷ swim | _____ | _____ |
| ❸ give | _____ | _____ | ❹ fly | _____ | _____ |
| ❺ speak | _____ | _____ | | | |

三 在括弧中適當的字下面畫一橫線

❶ The music sounds (sweet, sweetly)
❷ You are taller than (I, me)
❸ (Whom, who) is that man?
❹ You learn English grammar (easy, easily).
❺ (What, Which) of these toys do you like best?

四 主動語態改被動語態，被動語態改主動語態：

❶ I read a book _____
❷ I have eaten an apple _____
❸ He wrote a letter _____
❹ Our teacher tells us story _____
❺ A letter will be written by her_____

五 填空：

❶ Hainan is_____island.
❷ The horse is_____useful animal.
❸ Have you_____money.
❹ He was born_____Dec. 30. 1932.
❺ I get up_____six o'clock_____the morning.
❻ He is fond_____play.
❼ Please wait_____me at the door.
❽ He puts_____his hat.
❾ The letter is written_____English.
❿ Both you_____he are diligent.

六 答問題：

❶ What are the four seasons of a year?
❷ How many persons are there in your family?
❸ Do you want your country to be free and independent?
❹ Is China an ancient nation or a modern nation?
❺ Do you think that education is a good thing or a bad thing?

## 省立臺中第一中學

I Translate the following sentences into Chinese and vice versa:(30%)

❶ They are seeing their friends off.
❷ I choose what I want with great care.
❸ The playing children are very noisy.
❹ He worked hard in order to gain the prize.
❺ There came a messenger from a distant city.
❻ 服從父母親是孩子的責任。
❼ 這本書的作者是不著名的。
❽ 在炎熱的夏日午後，天空上常有白雲。
❾ 好學生必須有健康的身體。
❿ 他爲考試而煩惱。

II Give the antonyms of the following words:(10%)

For example: bad……good.

❶ beautiful ❷ careful ❸ cruel ❹ death ❺ different
❻ cheap ❼ crime ❽ accept ❾ absent ❿ admit

III Fill the following blanks with words: (20%)

❶ There_____some good news in this letter.
❷ She always arrives_____school a little early.
❸ He_____English well. ❹_____you have any sisters?
❺ The train leaves_____six o'clock.
❻ Her birthday is_____the fifteenth of January.
❼ He did not come,_____he was ill.
❽ We_____be ready in a few minutes.
❾ It has been raining_____two hours.
❿ The girl_____is playing piano is my cousin.

IV Correct the errors:(10%)

❶ The two sisters love one another.
❷ I went to my school tomorrow.
❸ He is think of his mother.
❹ He can ran quick.
❺ If I was a bird, I could fly away.

V Make one sentence with each of the given phrases: (30%)

❶ so ……that. ❷ different from. ❸ either or ❹ in front of
❺ full of ❻ again and again ❼ interested in ❽ too……to
❾ one by one ❿ instead of

## 省立臺中第二中學

A. Translate the following.

a. from English into Chinese:

❶ after all ❷ citizen ❸ later on ❹ at least
❺ cigarette ❻ cut into pieces ❼ policeman ❽ rickshow

❾ street car ❿ by no means

b. from Chinese into English:

❶ 音樂 ❷ 英雄 ❸ 同學 ❹ 消息 ❺ 槍
❻ 海岸 ❼ 鐵 ❽ 責罰 ❾ 快樂 ❿ 敵人

B. Fill in the following blanks:

❶ I must go_____once.
❷ He put a book_____the desk.
❸ He is_____clever_____you.
❹ We write_____our hands.
❺ He was so happy_____he did not know what to say.
❻ I shall remain_____you come.
❼ The man is poor_____he is honest.
❽ I do not agree_____you.
❾ The table is made _____wood.
❿ _____1949 he began to study English.

C. Translate the following paragraph into Chinese:

Many years ago, there was an emperor who was so fond of new clothes that he spent all his money on them. He did not trouble himself in the least about his soldiers or his country. He did not care at all about hunting or shooting. All he cared for was to show himself in his new clothes. He had a different coat for everyday of the year, and for every hour of the day.

D. Make sentences with:

❶ either……or ❷ able to ❸ like to
❹ afraid ❺ whose

E. Change the following sentences from the active to the passive voice:

❶ She teaches us. ❷ You broke the window.
❸ I shall tell a story. ❹ He is writing a letter.
❺ They have laughed at the man.

## 省立臺中女子中學

I Choose the correct word or phrase in the parentheses: 20%

❶ We (are taking, take, have taken) a lesson every day.
❷ I (saw, see, shall see) him yesterday.
❸ He (come, will come, came) tomorrow.
❹ He (go, goes) to bed very late.
❺ She and I prepare (her, my, our) lessons well.
❻ There (is, have, are) two books on the table.
❼ This park is (beautiful, beautifuler, more beautiful) than that one.
❽ He sings (good, well, nice)
❾ I usally come to work (in, on, by) train.

⑩ I go home (in, at, on) six o'clock.

Ⅱ Answer these questions: 20%

❶ Have you ever been to America?
❷ How long did you study Chinese in China?
❸ Where are you living now?
❹ Which city do you like best?
❺ Did you come to England by yourself or with someone?
❻ Are you busy today?
❼ Will you be here tomorrow?
❽ Can you speak English?
❾ At whom is he looking?
❿ How many students are there in the room?

Ⅲ. Fill the blanks: 35%

❶ The days of the week are _____ _____ _____ _____ _____ _____ _____

❷ The months of the year are _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

❸ The four seasons are _____ _____ _____ _____

❹ Write the numbers from 10 to 22 ten _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

Ⅳ Translate the following into Chinese: 25%

China must become modern. Western Science is not English Science or French Science or German Science. There is only one Modern Science. The man who loves China best is the one who wants her to adopt Western Science and become a modern nation.

## 省立臺中農業職業學校

一、Write (○) or (×) in the parentheses : (20%)

❶ Monday is the first day of the week. ..... ( )
❷ We come to school on Sunday. ..... ( )
❸ Newton was a great scientist. ..... ( )
❹ We have a long vacation in autumn. ..... ( )
❺ Lions and tigers are wild animals. ..... ( )
❻ There are many rice fields in Taiwan. ..... ( )
❼ We should play all day long. ..... ( )
❽ It is a bad habit to get up early. ..... ( )
❾ When you write a letter you put it in an envelope. ..... ( )
❿ Your mother's sister is your aunt. ..... ( )
⓫ The day that comes after to-day is called "yesterday" ..... ( )

⑫ Winter is the first season of the year. ..... ( )
⑪ People often give their friends presents. ..... ( )
⑭ If you fall into the water and can not swim you will be drowned. ..... ( )
⑮ A hare has two long ears. ..... ( )
⑯ In olden days people travelled on foot or on horseback. ..... ( )
⑰ Our flag has three colors, blue, white, and red. ..... ( )
⑱ Double Tenth Day is our national holiday. ..... ( )
⑲ We have five meals a day. ..... ( )
⑳ Chinese have black hair, and Americans have blond. ..... ( )

二、Choose the proper word in the parentheses : (10%)

Example : China is a (city, country, island) ..... (country)

❶ I (meet, met, meeting) him last week. ..... ( )
❷ I can swim very (nice, good, well) ..... ( )
❸ He ate too (great, much, many) pork. ..... ( )
❹ The book is (on, above, over) the desk. ..... ( )
❺ Mary is (song, sing, singing) now. ..... ( )

三、Fill in the blanks : (20%)

❶ I am glad_____see you.
❷ There are many_____of fruit.
❸ It will_____fine tomorrow.
❹ My head aches_____this morning.
❺ It is_____hot to work.
❻ Windows are_____of glass.
❼ John is_____youngest in this class.
❽ We take our lunch_____noon.
❾ We have English lesson_____Monday.
❿ They_____running along.

四、Write out the past tense and past participles of the following verbs. (10%)

❶ see ___ ___ ❷ come___ ___ ❸ carry___ ___
❹ catch___ ___ ❺ take ___ ___

五、Translate the following sentences into English : (20%)

❶ 我是一個學生。 ❷ 我每天學英語。 ❸ 烏鴉是黑色的鳥。
❹ 太陽照。 ❺ 我能看見這字。

六、Answer the following questions : (20%)

❶ How many fingers have you?
❷ What are the four seasons in a year?
❸ What do you say when you meet a friend in the street?
❹ Can you count the stars in the sky?
❺ Which runs faster, a hare or a totoise?

## 省立臺中高級工業職業學校

I 將下列中文譯爲英文：

❶ 朋友 ❷ 美麗 ❸ 重量 ❹ 習慣 ❺ 鄰居
❻ 六十分鐘 ❼ 忘記 ❽ 練習 ❾ 臺灣 ❿ 總統

II 將下列英文譯爲中文：

❶ June ❷ respect ❸ factory ❹ bicycle
❺ umbrella ❻ handkerchief ❼ science ❽ ox
❾ The Republic of China ❿ America

III 改正下列各句之錯誤：

❶ Don't he know my name?
❷ He go to the City once a week.
❸ I don't like to play with those boy.
❹ She gave many money to her son.
❺ You are taller than me. ❻ This pen broken.
❼ Whom is your father? ❽ This desk is made from wood.
❾ He is a honest man.
❿ The man who you met last week, is my brother.

IV 用下列各詞造句：

❶ in order that ❷ has been ❸ as if
❹ to visit ❺ at home

V 回答下列各問題：

❶ How old are you? ❷ Where were you born?
❸ What do you generally do on Sundays?
❹ Write the names of the English books that you have read.
❺ When do you get up in the morning and when do you go to bed in the evening?

## 省立臺中商業職業學校

I Give the English equivalents of the following Chinese and vice versa: (20%)

❶ 圖書館 ❷ 地震 ❸ 科學 ❹ 商業 ❺ 暑假
❻ 自由中國 ❼ 勝利 ❽ 西瓜 ❾ 銀行 ❿ 立刻
⓫ glory ⓬ sacrifice ⓭ justice ⓮ advertisement
⓯ birthday ⓰ help each other ⓱ afraid of ⓲ in stead of
⓳ as soon as ⓴ no longer

II Correct the mistakes in the following sentences: (20%)

❶ The sun rises from the east. ❷ Work hard, and you will fail.
❸ Who do you like best? ❹ It had rained last night.
❺ He or you has taken my book. ❻ Both you and he is to blame.
❼ He is as old as me. ❽ The water in the pool are fresh.
❾ June come before July.

⑩ If I am a bird I would fly in the sky all day.

Ⅱ Change the statements into questions: (15%)

❶ He goes to school every day. ❷ He may catch the train.
❸ There are many kinds of soil. ❹ He can swim quickly.
❺ She is writing a letter.

Ⅳ Fill in blanks: (20%)

❶ This table is made_____wood_____the carpenter.
❷ The sun rose_____six o'clock_____the morning.
❸ I shall fly_____the top_____that tree.
❹ I was born_____the third_____July.
❺ He used to get up_____dawn. ❻ It belongs_____him.
❼ We come here_____train. ❽ I called_____him at his house.
❾ I quite agree_____you.
❿ This work must be done_____ten o'clock.
⓫ She turned to him_____a smile.
⓬ It is about half a mile_____my house_____my school, and it _____about a quarter of_____hour to get there_____foot.

Ⅴ Translate the following into English: (25%)

❶ 太陽和月亮那一個較大。 ❷ 一年有四季：春、夏、秋、冬。
❸ 我相信地球是圓的。 ❹ 我的父親前天回來。
❺ 多麼好的天氣！

## 省立大甲中學

Ⅰ Vocabulary. 10%

❶ health ❷ experience ❸ polite ❹ train
❺ friend ❻ 老師 ❼ 美麗的 ❽ 郵政局
❾ 七月 ❿ 教室

Ⅱ Fill the following blanks: 10% (填充)

❶ We shall go in spite_____the rain.
❷ Both you_____he are diligent.
❸ He as well as you_____my friend.
❹ I get up_____six o'clock in the morning.
❺ All books are made_____paper.
❻ Where there is a_____, there is a way.
❼ His elder brother is taller_____he.
❽ She is rich,_____I am poor.
❾ I have lost the watch_____I bought yesterday.
❿ She is_____prettiest of all the girls in school.

Ⅲ Correct the mistakes in the following sentences: 10% (改錯)

❶ The earth was round. ❷ Have you some books?
❸ The sky is on our head. ❹ Her mother is a old man.

❺ She has a friend whom is a teacher.

Ⅳ Answer the following questions : 20% (回答下列各問題)

❶ How old are you?
❷ What are the four seasons of a year?
❸ How many persons are there in your family?
❹ Which lesson do you like best?
❺ How long have you studied English?

Ⅴ Change the following sentences from the active voice into the passive voice and vice versa : 15%(改變句子由自動改爲被動，或由被動改爲自動)

❶ He has learned his lessons.
❷ A watch was given me by him.
❸ I shall finish this work to-morrow.
❹ A letter is written by my friend.
❺ Our teacher corrects our exercise books.

Ⅵ Make sentences with the following : 15% (造句)

❶ not only……but also. ❷ fond of ❸ larger than
❹ to take care of ❺ read.

Ⅶ Translate the following sentence into Chinese : 10%(翻譯下列各句成中文)

❶ We should love our country.
❷ I have not a moment's leisure at present.
❸ The 10th of October is the birthday of the Republic of China.
❹ Mary and her brother always study and play together.
❺ Our duty at the present time is to fight against Communism and Russia.

Ⅷ Reading Test : 10%

Abraham Lincoln (林肯) was a very kind man. He was always a friend of the poor and the weak. One day when he was riding with his friends through a wood, he saw a little bird by the roadside. It had fallen from its nest in a tree near-by and was trying to fly back to it.

After riding a short distance, Lincoln said to his friends, "Please wait a moment. I'll be back soon." So they stopped their horses and waited. Lincoln went to pick up the bird and put it back into its nest.

If the statement is correct, put "+" in the parentheses.

If it is not correct, put "—"(讀上列文章後在下面括弧內，意義對的寫"+"不對的寫"—"號)。

❶ Abraham Lincoln was riding with his teacher.…… ( )
❷ He saw a little bird by the roadside. …… ( )
❸ The nest was in a tree near-by.…… ( )
❹ His friends did not wait for him. …… ( )
❺ Lincoln went to pick up the bird and put it back into its

nest.....( )

## 省立彰化中學

I. Correct the errors in the following: 30%

❶ The sun shine brightly all day.
❷ The teacher saw he and I.
❸ Neither my uncle nor my aunt visit us.
❹ I saw a cent, running across the street.
❺ Who did you choose for captain?
❻ I have written a letter yesterday.
❼ He is the tallest of the two.
❽ Snow begun to fall.
❾ We were taught that honesty was the best policy.
❿ It had better to die than disgrace himself.

II. Change each singular noun to its plural form: 20%

| | | | |
|---|---|---|---|
| ❶ hero | ❷ baby | ❸ wife | ❹ student |
| ❺ valley | ❻ mouse | ❼ deer | ❽ ox |
| ❾ woman | ❿ goose | | |

III Underline the correct English words in the following: 20%

| | | | |
|---|---|---|---|
| ❶ 早餐 | a. brush | b. bottom | c. breakfast |
| ❷ 愉快的 | a. careful | b. cheerful | c. cheep |
| ❸ 規則的 | a. regular | b. remarkable | c. rapid |
| ❹ 戲院 | a. theatre | b. thrifty | c. tramcar. |
| ❺ 潛水艇 | a. superior | b. submarine | c. steamer |
| ❻ 懶惰的 | a. idle | b. ignorant | c. industry |
| ❼ 圖書館 | a. latter | b. ladder | c. library |
| ❽ 留聲機 | a. pipe | b. phonograph | c. promotion |
| ❾ 政治家 | a. statesman | b. stranger | c. surface |
| ❿ 木炭 | a. convenience | b. cargo | c. charcoal |

IV Rewrite the following sentences by changing the voice: 30%

A. Change the active voice to passive voice:

❶ The servant broke the cup.
❷ All his friends laughed at him.
❸ John told them a story.

B. Change the passive voice to active voice;

❶ The roof of the house was broken off by the wind.
❷ The crops were destroyed by the flood.
❸ The ship was seized by the enemy.

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## Ⅰ. 字彙

（Ⅰ） 根據下面音符寫出英文字： 5%

❶ ək'sept ……（ ）
❷ 'biznis ……（ ）
❸ ku:d ……（ ）
❹ geit ……（ ）
❺ 'ənə ……（ ）

（Ⅱ） 根據下面中文意義將對的英語號數寫在（ ）中： 5%
註：也許有兩個對號請一同寫在（ ）中

❻ 寫字 ① right ② light ③ wright ④ write （ ）
❼ 星期一 ① Monday ② moonday ③ mounday ④ noonday（ ）
❽ 物理 ① phase ② physics ③ phrase ④ physic （ ）
❾ 自由 ① library ② literary ③ liberty ④ freedom（ ）
❿ 糖 ① sugar ② sogur ③ suger ④ shoger （ ）

（Ⅲ） 根據下面英文字將中文意義對的號數寫在（ ）中： 5%
註：也許有兩個對號請一同寫在（ ）中

⓫ market ①符號 ②市場 ③鹽 ④刻客……（ ）
⓬ principal ①校長 ②原理 ③主要的 ④王子……（ ）
⓭ tread ①交易 ②對待 ③踐踏 ④條約……（ ）
⓮ passenger ①一段文章 ②旅客 ③消息 ④經過……（ ）
⓯ wander ①驚異 ②需要者 ③涉水 ④徘徊……（ ）

## Ⅱ. 語法

（Ⅳ） 根據下面句意將〔 〕中適合填充的字或詞號數寫在（ ）中： 10%
〔① what ② which ③ around ④ at ⑤ round ⑥ in ⑦ am ⑧ were ⑨ went ⑩ going〕

⓰ The game began ___3 o'clock.……（ ）
⓱ The earth moves _____ the sun. ……（ ）
⓲ If I_____ you I would study hard.……（ ）
⓳_____ do you like best ? ……（ ）
⓴ I am_____to school.……（ ）

（Ⅴ） 根據下面句意將〔 〕中適合改錯的字或字詞號數寫在（ ）中： 10%
註：也許有兩個對號請一同寫在（ ）中
〔① well ② do ③ writing ④ write ⑤ the ⑥ at ⑦ an ⑧ saying ⑨ have〕

㉑ I am written a letter.……（ ）
㉒ He is a old man.……（ ）
㉓ What are you say?……（ ）
㉔ People laughed him.……（ ）
㉕ He can speak English very good.……（ ）

(Ⅵ) 將下面各組字詞依照句意將字的號數排列在（ ）中： 10%

舉例：① boy ② am ③ good ④ a ⑤ I …… (5 2 4 3 1)

㉖ ①doing ②you ③what ④now ⑤are ⑥? ……( )

㉗ ②book ②a ③stood ④he ⑤there ⑥reading…… ( )

㉘ ①fail ②study ③or ④will ⑤hard ⑥you……( )

㉙ ①student ②what ③diligent ④a, ⑤are ⑥you ⑦!… ( )

㉚ ①teaching ②who ③he ④man ⑤the ⑥is ⑦her ⑧English ⑨is……( )

## Ⅱ. 閱讀：

(Ⅶ) 先仔細閱讀下面 A的英文然後將下列 B問題各組中適當的字詞號數寫在（ ）中： 15%

A. 讀 文

My best friend is a most learned man. He knows every thing and studies nearly all the languages spoken by mankind. His memory is extremely remarkable. He remembers whatever happened in the world either present or past. He has taught millions upon millions of young men. He is not only my best friend, but that of many others. Do you know what his name is ?

B. 問 題

㉛ My best friend is ① an honest man ② a learned man ③ my old friend ④ a most learned man.……( )

㉜ He knows ① nothing and some languages ② all things and most languages ③ every thing and almost all the languages in the world ④ all things and all language ……( )

㉝ He has ① very good ② poor ③not so good ④bad memory ……( )

㉞ He is ① only my ② many others' ③ all people's ④ some people's best friend……( )

㉟ What is his name? His name is ① School ② Library ③ Teacher ④ Book……( )

## Ⅳ 寫 作：

(Ⅷ) 中譯英： 20%

㊱ 明天你來嗎？ ㊲ 我太疲倦了。 ㊳ 我要買一本新書。

㊴ 我讀了三年英語。 ㊵ 你願意和我去游泳嗎？

(Ⅸ) 造句： 20%

㊶ To look at ㊷ with our eyes ㊸ is seeing?

㊹ because ㊺ but

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〔1〕Answer the following questions: (20%)

❶ What month is the fifth month of the year?
❷ What do you call a man, who teaches you lessons?
❸ How old are you?
❹ How many English books have you read?
❺ At what o'clock do you come to school in the morning?

〔2〕Fill in the blanks: (20%)

❶ He and I_____ friends. ❷ I put it_____the desk.
❸ I must go_____once. ❹ _____he come to-day?
❺ We_____not know how to do it.

〔3〕Choose the right word in the brackets: (20%)

❶ He (live, lives) in a farmhouse. (　　)
❷ Water (is, am, are) necessary to life. (　　)
❸ Let (I, me, my) go. (　　)
❹ She (have, has) a baby. (　　)
❺ They are (write, writing) their exercises. (　　)

〔4〕Correct the errors in the following sentences: (20%)

❶ He is a old man.
❷ When we come to school, we am very happy.
❸ She write with a new pen.
❹ You, he, and I am all Chinese.
❺ My brother likes to playing ball.

〔5〕Rearrange each of the following groups of words so as to make a complete sense. (10%)

❶ Is year season first the spring of the.
❷ I walk school to every day. ❸ Your love country you do?
❹ A dog of meat had once a piece. ❺ They good to are eat.

〔6〕Translate the following sentences into Chinese: (10%)

Double Tenth Day is a national holiday. It is the birthday of "The Republic of China". On Double Tenth Day, all the schools and shops are shut. There is a flag at every door.

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I Give the note (註譯) 20% :

❶ train ❷ advertisement ❸ invitation ❹ camera
❺ dictionary ❻ as soon as ❼ a little ❽ put on
❾ belong to ❿ consist of

I Translate the following sentences into Chinese (譯下列各句爲中文) 20% :

❶ Work while you work, play while you play.
❷ In a football game, each team has eleven players.
❸ The more books you read, the more you know.
❹ Boats had been used by men many thousands of years before anyone tried to make one go by steam.
❺ Summer is the hottest season of a year. We do not like it.

Ⅲ Translate the following sentences into English (譯下列各句爲英文) 20% :

❶ 她是誰？ ❷ 他們正在讀國文。
❸ 星期日是星期中的第一日。 ❹ 碟子在刀與叉之間。
❺ 一刻鐘是一點鐘的四分之一。

Ⅳ Give the past tense and the past participle of the following verbs. (寫出下列動詞的過去詞及過去分詞) 20% :

| | Past | Past Participle | | Past | Past Participle |
|---|---|---|---|---|---|
| ❶ read | _____ | _____ | ❷ know | _____ | _____ |
| ❸ go | _____ | _____ | ❹ do | _____ | _____ |
| ❺ make | _____ | _____ | ❻ eat | _____ | _____ |
| ❼ stand | _____ | _____ | ❽ see | _____ | _____ |
| ❾ teach | _____ | _____ | ❿ take | _____ | _____ |

Ⅴ Correct the errors in the following sentences. (改錯) 10% :

❶ The united states of america is not my country.
❷ I loves the flag of my country.
❸ Look to the table.
❹ I stir my tea in a spoon.
❺ That is a teeth.

Ⅵ Give the opposite words. (寫出下列各字的反義字) 10% :

❶ high _____ ❷ long _____ ❸ beautiful _____
❹ in _____ ❺ here _____

## 省立員林中學

Ⅰ Translate the following passages into Chinese: (25%)

The first son could hold all the water he wanted in his mouth. The second son could grow as tall or as short as he wished. The third son could be covered with boiling water or ice water and not suffer any harm. The fourth son could make himself as hard as the hardest in the world, and the fifth son could get out of any place into which he was put.

Ⅱ Fill each of the following blanks with a suitable word: (20%)

❶ There_____seven students in the room yesterday.
❷ Either he_____I am diligent.
❸ The boy_____came here yesterday is my younger brother.
❹ If I let you out of the cage, you_____eat me.

❺ My school has a Sports Day_____a term.
❻ It has been more than one month_____I saw you last time.
❼ This pencil differs_____that.
❽ It is so high_____I can not reach it.
❾ Where_____you come from, old man?
❿ If I_____you, I should go immediately.

Ⅲ Correct the errors in the following sentences: (20%)

❶ She goes buy books. ❷ We studied a history of France.
❸ I and you are good friends. ❹ I eat nothing since yesterday.
❺ Let me to go home. ❻ If I were her, I would talk less.
❼ He can drink many water.
❽ No boy nor girl are allowed to play in class.
❾ My friend, Mr. Wang, could spoke English.
❿ Iron is the most useful of all other metals.

Ⅳ If the statement is true, put "+" in the parentheses. If it is false, put "−". (10%)

❶ Man should be honest. ····· ( )
❷ We go to school on Sunday. ····· ( )
❸ The sun rises in the west. ····· ( )
❹ Taiwan is an island of China. ····· ( )
❺ Three and four make seven. ····· ( )
❻ The desk is made of paper. ····· ( )
❼ The chalk is black. ····· ( )
❽ We must get up early. ····· ( )
❾ He brushes his teeth every morning. ····· ( )
❿ Boys and girls enter in the primary school at 10 age. ····· ( )

Ⅴ Give the opposite words of the following: (10%)

❶ better ( ) ❷ public ( ) ❸ poor ( )
❹ soft ( ) ❺ warm ( ) ❻ short ( )
❼ round ( ) ❽ war ( ) ❾ ugly ( )
❿ easy ( )

Ⅵ Change the following voices from active to passive and vice versa: (15%)

❶ They like him. ❷ I shall be taught by him.
❸ We are writing English. ❹ Mary has caught a bird.
❺ Today many signs are seen by us on the road.

## 省立員林農業職業學校

Ⅰ Translate the following sentences into Chinese : (30%)

❶ The man who loves China best is the one who wants her to become a modern nation.
❷ Don't put off till tomorrow what you can do today.

❸ We eat to live, not live to eat.

Ⅰ Give the noun word to each of the following adjective words : (10%)

❶ happy ❷ silent ❸ idle ❹ diligent ❺ free
❻ poor ❼ true ❽ wise ❾ high ❿ honest

Ⅱ Give the past and past participle of the ollowing verbs : (10%)

| present | past | past participle | present | past | past participle |
|---|---|---|---|---|---|
| ❶ keep | _____ | _____ | ❷ do | _____ | _____ |
| ❸ go | _____ | _____ | ❹ have | _____ | _____ |
| ❺ teach | _____ | _____ | | | |

Ⅲ Translate the following words into English : (15%)

❶ 双十節 ❷ 警察 ❸ 動物 ❹ 双親
❺ 祖父 ❻ 總統 ❼ 口頭 ❽ 歷史
❾ 母親 ❿ 考試

Ⅳ Fill the blanks : (15%)

❶ The building is_____school. ❷ She is_____sister.
❸ This book is_____English Reader.
❹ I have_____brothers. ❺ I go_____home.

Ⅴ Answer the following questions : (20%)

❶ How many months are there in a year?
❷ How many persons are there in your family?
❸ Which do you like better English or mathematics?
❹ Why do you like China?
❺ How old are you?

## 省立斗六中學

(A) 單字：中文註英文，英文註中文（共25分）

❶ 牙齒 ❷ 脚踏車 ❸ 俄國 ❹ 敵人 ❺ 匪
❻ 雷 ❼ 橘子 ❽ 火車 ❾ 蚊蟲 ❿ 蠅
⓫ 扇子 ⓬ 早餐 ⓭ 郵差 ⓮ 出席 ⓯ 公園
⓰ 香蕉 ⓱ 鳳梨 ⓲ 公共汽車 ⓳ 歷史 ⓴ 地理
㉑ 教育 ㉒ 字典 ㉓ 飛機 ㉔ 銀行 ㉕ 蔬菜
㉖ mistake ㉗ Communism ㉘ tail ㉙ wheel
㉚ fork ㉛ village ㉜ kitchen ㉝ freedom
㉞ elephant ㉟ oil ㊱ fashion ㊲ opportunity
㊳ condition ㊴ attention ㊵ silent ㊶ professor
㊷ problem ㊸ elbow ㊹ chemistry ㊺ ocean
㊻ angler ㊼ physical ㊽ humor ㊾ hospital
㊿ intelligent

(B) 是非法：下列各句錯的在括弧內劃（×），對的劃（○）。（共10分劃錯時倒扣1分）

❶ The cat catched many mice..... ( )
❷ He needs not come on Sundays..... ( )

❸ That idle boy is tell lie again.....( )
❹ I get up early every morning.....( )
❺ The tiger is very much like the cat.....( )

(C) 填充法：將下列各句空白填入適當的字，每句一字（共50分）

❶ I'll take care___you.
❷ Some rooms are used___sleeping.
❸ ___you seen a tiger.
❹ He___playing basketball now.
❺ I like to___English.
❻ He is fond of___English.
❼ Each of the six boys___a book.
❽ The dog___his master.
❾ He___the letter yesterday.
❿ I have___English for three years.
⓫ There___four seasons in a year.
⓬ President Chiang is a great___.
⓭ ___is hot today.
⓮ We___a bath everyday.
⓯ Windows are made___glass.
⓰ The tree is loaded___apples.
⓱ Is your mother___home.
⓲ April is a___month.
⓳ A Scout is___to his country.
⓴ He is___tall as I.
㉑ He is wiser___you.
㉒ No place is___sweet as home.
㉓ Father likes___
㉔ I haven't___money.
㉕ Columbus___America.
㉖ Work___you work!
㉗ The queen ants___eggs.
㉘ Vitamin A keeps you___well.
㉙ ___you a family here?
㉚ He___two brothers.
㉛ There are many people___the Zoo.
㉜ It is made___steel.
㉝ I saw a bird's nest high up___the tree.
㉞ He is very fond___tea.
㉟ He is good___English.
㊱ The dog barks___the strangers.
㊲ I was born___1930.
㊳ We___a vacation in summer.
㊴ I___absent yesterday.
㊵ About a hundred years___travel was slow.
㊶ Tell me___the city bank is.
㊷ I know___about history.
㊸ Tea leaves are___by women.
㊹ ___hot water in the teapot.
㊺ We use___in the making of bridges.
㊻ I saw two boys___were passing by.
㊼ Keep your bicycle in a___place.
㊽ My brother and sister are___with a ball.
㊾ I have not___a monkey before.
㊿ Yesterday I___to school.

(D) 翻譯：將下列各句的意義譯成中文（共15分）

❶ The revolution has not yet succeeded, and our comrades should strive on.

❷ The shortest distance between two points is a straight line.
❸ A rolling stone gathers no moss.

## 省立嘉義中學

(一) Make sentences with the following words:
❶ wrong-doing ❷ send for ❸ to know ❹ cross over
❺ as to ❻ one another ❼ as soon as ❽ asked for
❾ difficulty ❿ much the same

(二) Correct the following mistakes:
❶ His uncle took the care of I and my young sister.
❷ I have met him yesterday.
❸ Although I come, but he will go.
❹ What a pretty bird is it!
❺ I am fond of apples; if you have some, please give me any.
❻ Will you please to do me a favor?
❼ Five dollars are not enough.
❽ Can I go with you to-morrow?
❾ I see the plant grow every day.
❿ He did that was right.

(三) Fill the following blanks:
❶ You and I ( ) good friends.
❷ He can run ( ) than I can.
❸ Gold is not ( ) valuable ( ) iron.
❹ The boy was punished ( )
❺ Careless boys do their work ( )
❻ The field is cultivated ( ) the farmer.
❼ I shall come on the ( ) ( ) day.
❽ There was only one boy ( ).
❾ I quite agree ( ) you.
❿ He was not cruel, ( ) the contrary he was kind.

(四) Give the nouns corresponding to the following verbs:

| verb | noun | verb | noun |
|---|---|---|---|
| ❶ Prepare | _____ | ❷ Speak | _____ |
| ❸ Know | _____ | ❹ Read | _____ |
| ❺ Protect | _____ | ❻ Imagine | _____ |
| ❼ Think | _____ | ❽ Serve | _____ |
| ❾ Live | _____ | ❿ Pay | _____ |

(五) Give the following opposite words:
❶ Fail ( ) ❷ Friend ( )
❸ Love ( ) ❹ Wife ( )
❺ Uncle ( ) ❻ Same ( )

❼ Often ( ) ❽ Wise ( )
❾ Cruel ( ) ❿ Win ( )

## 省立嘉義女子中學

I Vocabulary

❶ announce _____ ❷ breeze _____ ❸ camel _____
❹ magazine _____ ❺ army _____
❻ advertisement _____ ❼ eagle _____ ❽ scientific _____
❾ offer _____ ❿ shake _____ ⓫ 玩具 _____
⓬ 考慮 _____ ⓭ 帝國 _____ ⓮ 慈悲 _____
⓯ 溫度 _____ ⓰ 香煙 _____ ⓱ 憂愁 _____
⓲ 構造 _____ ⓳ 敵人 _____ ⓴ 河岸 _____

I Fill in the following blanks.

❶ I _____ writing a letter.
❷ He wants _____ know the answer.
❸ _____ you seen my brother?
❹ The dog and the cat _____ animals.
❺ He _____ in town.
❻ The Registrar and Magistrate _____ us to do the work.
❼ This is _____ beautiful than that.
❽ The man _____ you met last night is a thief.
❾ The teacher saw him and _____.
❿ It is _____ who knock at the door.

I Translate the following passages into Chinese.

❶ The first son could hold all the water he wanted in his mouth. The second son could grow as tall or as short as he wished. The third son could be covered with boiling water and not suffer any harm. The fourth son could make himself as hard as the hardest thing in the world, and the fifth son could get out of any place into which he was put.

❷ If you put small stones in a tin and shake it up, you get a noise. The stones hit against one another and against the tin, and start vibrations. Some of the vibrations are small and some are large, some are quick and some are slower. It all depends upon how the stones hit. There is a mix-up of sounds, because the stones hit in all sorts of ways. That noise is not at all like music.

IV Answer the following questions.

❶ What day is to-day?
❷ How long have you been studying English?
❸ Do you like English? Why?
❹ Do you know Japanese?

❺ How many members are there in your family?

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I Put the following English into Chinese: (20%)

❶ milk ❷ water-way ❸ agriculture ❹ graduate
❺ whether ❻ scientific ❼ in order to ❽ call on
❾ agree with ❿ in short

I Select the correct words in the parentheses: (30%)

❶ Success depends (upon, in, by) how much you have done.
❷ It is (me, mine, I) who did it.
❸ Can you come and see me (on, in, at) noon
❹ I met a gentleman (whom, who, which) is my uncle's friend.
❺ If I (am, be, were) you, I would not do it.
❻ Are you (open, opening, opened) the door?
❼ What (did, do, done) you do last Sunday?
❽ I saw (much, many) trees near by.
❾ The rain is (come, came, coming) down.
❿ We (do, did) not come to school every day.

II Translate the following sentences into Chinese: (25%)

❶ A rolling stone gathers no moss.
❷ Before long you will get used to it.
❸ I wonder what prevented him from coming.
❹ A full-grown chicken weighs from 3 to 6 pounds.
❺ He gave up the idea of going abroad.

IV Translate the following into English: (25%)

❶ 在嘉義有許多中等學校。
❷ 有錢的人不一定幸福。
❸ 她比我高二吋。
❹ 我星期日到教會去做禮拜。
❺ 今天是星期幾呢？

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I Give the past form and the past participle of the following verbs : (20%)

| | | | | | |
|---|---|---|---|---|---|
| love | _____ | _____ | see | _____ | _____ |
| put | _____ | _____ | write | _____ | _____ |
| send | _____ | _____ | become | _____ | _____ |
| start | _____ | _____ | teach | _____ | _____ |
| read | _____ | _____ | study | _____ | _____ |

I Fill the following blanks with proper words : (20%)

❶ I write_____my hands.
❷ Nobody can live_____air.
❸ I take care_____the baby.

❹ A book is different_____a pen.
❺ This book belongs_____me.
❻ Don't be afraid_____me.
❼ I get up_____six o'clock every morning.
❽ He_____here yesterday.
❾ He is as careful_____you.
❿ You can not depend_____him.

Ⅲ Correct the mistakes in the following sentences : (20%)

❶ I writing a letter to my father.
❷ Are you love your mother?
❸ She will sees you to-morrow.
❹ The game began in 3 o'clock.
❺ Your brother is old than me.
❻ I have two hand and two foot.
❼ Did you saw the men?
❽ Either we or she are wrong.
❾ I drink many water.
❿ He sits among you and her.

Ⅳ Answer the following quesitions : (20%)

❶ When we part, what do we say?
❷ Have you written an English letter?
❸ When did you come to Chiayi?
❹ How much money have you in your pocket?
❺ How long have you learned English?

Ⅴ Translation : (20%)

I love my country. I love our people. I want my country to be free and independent. I want our people to be happy and prosperous. For my country I will work and for our people, I will serve.

I love peace, but I will gladly fight for the sake of right, of freedom, and of justice. I love my life, but I will gladly die for our people and for the glory of my country.

## 省立嘉義商業職業學校

Ⅰ Put "+" in the parentheses if the statement is correct in fact. Put "--" if the statement is incorrect in fact. 20%

❶ What is good to us may be bad to others.…… ( )
❷ The greenhouse is a house for men to live in.…… ( )
❸ Sandy soil dries again as soon as the rain has stopped.…… ( )
❹ In writing a business letter we have to put the inside address of the receiver in the right-hand margin of the letter.…… ( )

❺ To throw stones at frogs is not foolish cruel action. ····· ( )
❻ A sound sleep during the night has nothing to do with good work the next day. ····· ( )
❼ A man without a purpose is like a ship without a rudder. ····· ( )
❽ The sun rises in the west and sets in the east. ····· ( )
❾ Cocks and hens often dig in the earth for worms. ····· ( )
❿ Overwork is bad, but overeating is still worse. ····· ( )

Ⅰ Write out the other two parts of the following verbs : 20%

| | Present | Past | Past participle | | Present | Past | Past participle |
|---|---|---|---|---|---|---|---|
| ❶ | | came | | ❻ | | fell | |
| ❷ | cut | | | ❼ | | | left |
| ❸ | | | known | ❽ | begin | | |
| ❹ | | kept | | ❾ | write | | |
| ❺ | sit | | | ❿ | let | | |

Ⅱ Rewrite the following sentences, changing the verbs in the active voice to the passive, and those in passive to the active : 20%

❶ You have finished the letter.
❷ This question is answered by him and her.
❸ I told them an interesting story.
❹ This lesson has been taught by my teacher.

Ⅳ Correct the errors : 20%

❶ The merchant saw one whom had been there the day before.
❷ I did not sleep very good last night.
❸ The two balls hit against one another.
❹ You must do neither this or that.
❺ I found his smiling.
❻ It is cold to-day than yesterday.
❼ Mr. Brown, my teacher, who is a good scholar.
❽ We do not feel the earth to move under us.
❾ The boys near the door speaks English fluently.
❿ My brother is reading every day.

Ⅴ Fill the blanks in the following sentences with suitable words : 20%

❶ The boy of_____I spoke to you yesterday has come.
❷ I am tired_____writing letters to him.
❸ After she_____read the letter, she told the story to her son.
❹ What is the matter_____him.
❺ Get as many stones_____you can.
❻ If there_____no soil, there would be no plants.
❼ I wake_____early in the morning.

⑧ You must not judge of things from _____ you saw or heard of.
⑨ Those _____ are Chinese must be loyal to China.
⑩ This is the place _____ he lives.

## 省立嘉義家事職業學校

I 試用中文註釋下列諸英文：
❶ office ❷ smoke ❸ fly ❹ noise ❺ peace
❻ noble ❼ jump ❽ history ❾ village ❿ holiday

II 試用英文註釋下列諸中文：
❶ 百 ❷ 清潔 ❸ 首都 ❹ 科學 ❺ 西瓜
❻ 敵人 ❼ 計算 ❽ 蝴蝶 ❾ 士兵 ❿ 忽然

III 譯下列英文爲中文：
Air is necessary to our life. Without air no one can live. Without food and water men can live for some days, but without air nobody can live even for a few minutes.

V 填寫下列各句的空白：
❶ His mother _____ a kind woman.
❷ She _____ studied English for three years.
❸ A girl _____ reading in the classroom.
❹ Last year my aunt _____ to see us in summer.
❺ This story is _____ by a famous writer.
❻ The man _____ is standing on the platform is my brother.
❼ The sun _____ in the east and _____ in the west.
❽ This is the _____ student in our class.
❾ He wants _____ study very much.
❿ A boy and a girl _____ coming.

## 省立虎尾中學

I Translate the following sentences into Chinese (由英譯漢)：
❶ Always try to do your share of the work and take your share of responsibilities. ( )
❷ A Scout is polite to everybody, men and women, children and old people, rich and poor alike. ( )
❸ The new movies may make present moving pictures seem old-fashioned. ( )
❹ All of us want things we don't have or wish to do things we can't do. ( )
❺ Give your doctor, once you have decided upon him your full confidence and trust. ( )

II Explain the following words (釋義)：

❶ television set ❷ cod-liver oil ❸ electricity ❹ education
❺ San Francisco ❻ vitamin ❼ passenger ❽ china cup
❾ Pacific Ocean ❿ theory ⓫ freedom ⓬ professor
⓭ birthday ⓮ dentist ⓯ saliva ⓰ zero
⓱ fire extinguisher ⓲ ambassador ⓳ hospital ⓴ geologist

Ⅲ Translate the following sentences into English (由漢譯英)：

❶ 我有很多好朋友。
❷ 一星期有七天，即星期日，星期一，星期二，星期三，星期四，星期五和星期六。
❸ 我是中國人，你是日本人而他是美國人。
❹ 學英文不容易，學中文更難。
❺ 對於青年人，念書是很重要的。

Ⅳ Fill the blanks (填空)：

❶ He_____many books.
❷ You_____ a student.
❸ My pen is better than_____.
❹ Mary looks_____the pictures.
❺ _____of the students has a name.
❻ He is the greatest man_____I know.
❼ The dog runs_____the cat.
❽ I_____sixteen years old.
❾ He is a student_____name is Jack.
❿ One of the two is a student, the_____a merchant.

Ⅴ Make sentences (造句)：

❶ as soon as ❷ belong to ❸ by means of ❹ fond of ❺ in spite of

Ⅵ Turn the declarative sentences into interrogative (將平敘句變爲疑問句)

❶ You look well. ❷ Your mind is filled with good thoughts.
❸ I have finished my lesson.
❹ He asks our teachers some questions. ❺ She went home.

Ⅶ Correct the errors (改錯)：

❶ The boy play the ball. ❷ He wents to school.
❸ Both he and she is beautiful.
❹ He as well as I am good friends.
❺ The music sounds sweetly ❻ One of the boys have a book.
❼ Let me to speak a little. ❽ They all laugh in the man.
❾ He is taller than me. ❿ It is me who knock at the door.

Ⅷ Change voice (改變語氣)：

❶ Our English teacher teaches us English.
❷ He wrote a letter. ❸ A book is taken by me.
❹ I shall see my brother. ❺ I have finished my lessons.

Ⅸ Answers：(問答)

❶ Should a Scout smile under all difficulties?
❷ What do you say when you are introduced to someone?
❸ Have you sisters and brothers?
❹ What colors can you see at sunset?
❺ What are you doing now?

X Conjugate the verbs (動詞的變化) :

| present | past | past participle | present | past | past participle |
|---|---|---|---|---|---|
| ❶ buy | | | ❻ | went | |
| ❷ | began | | ❼ be {is / are} | | |
| ❸ tell | | | ❽ | did | |
| ❹ | | given | ❾ | | sung |
| ❺ write | | | ❿ teach | | |

## 省立虎尾女子中學

I Translate the following into Chinese : 10%

Once an old Indian woman came to the castle and talked about the fountain of youth. She said it was on a lovely island that was far to the north. The name of the island was Bimini.

The young man asked the woman questions. He thought of what she had said, and at last he made up his mind to go and hunt for this wonderful fountain. The woman said she would show him the way.

I Translate the following into English : 15%

❶ 我每天必須到學校。
❷ 昨天你看見她嗎？
❸ 他不喜歡吃魚。
❹ 這個兵士多麼勇敢啊！
❺ 明天我將拜訪我的朋友。

I Change the following sentences from active voice into passive voice and vice versa : 15%

❶ The policeman caught a thief.
❷ I shall write a composition.
❸ The lion was killed by them.
❹ She has sent her sister to post the letter.
❺ The lesson is taught by Mr. Wang.

M Correct the errors in each of the following sentences : 20%

❶ There are many lady in the room.
❷ They like to play with we.
❸ Who broke the window? It was him.

❶ He had come to see me yesterday.
❺ Did you met her in the street last night?
❻ My younger sister will went to Tai-pei tomorrow.
❼ She is more taller than I.
❽ Miss Chang and her elder sister love one another.
❾ I do not like swim.
❿ Neither you nor he are my schoolmate.

Ⅴ Fill in each blank with a proper word. 20%

❶ Where_____you going? ❷ _____sweetly she sings!
❸ This tree is bigger_____that.
❹ I_____not speak English well.
❺ How_____days are there in a week?
❻ The house_____built by them in 1950.
❼ The boy_____thrown a stone through the window.
❽ I shall_____taking my breakfast when you come tomorrow morning.
❾ This is my brother_____is reading a newspaper.

Ⅵ Choose the right word in each case : 20%

❶ Have you (some, any) paper?
❷ (Are, Were, Is, Was) there many girls in the park yesterday?
❸ That (breaking, broken) glass is made in England.
❹ We should (go, went, gone) to school on time.
❺ You must study (hardly, hard)
❻ To (who, whose, whom) did he speak?
❼ This is the boy (who, whose, whom) the teacher punished.
❽ The meeting was held (in, on, at) June.
❾ Each of them (likes, like, liked) to smoke.
❿ He drank too (many, much) wine.

## 省立臺南第一中學

Ⅰ. Make sentence with each of the following phrases: (造句) 20%

❶ proud of ❷ equipped with ❸ rich in
❹ in company with ❺ interested in

Ⅱ. Fill the following blanks with appropriate words: (填充) 20%

❶ I am satisfied_____your answer.
❷ To tell a lie is_____my dignity.
❸ They are apt_____make mistakes in their compositions.
❹ No one is familiar_____the stranger.
❺ We have to obey our parents_____a murmur.

Ⅲ. Correct the errors in the following sentences: (改錯) 20%

❶ The student answered me in dignity.
❷ My mother prevented me to go.
❸ Last Monday a fire broke in her home.
❹ Her younger brother jumped in the river.
❺ Our teacher told us not give up the game.

Ⅳ Parse the following sentences: (分析詞類) 20%

❶ A diligent student will never be idle.
❷ We always go to school in the morning.
❸ Each boy has his responsibility.
❹ English is important to every boy or girl.

Ⅴ. Read the following two paragraphs carefully and fill a right number in each of the given brackets. (詳閱下列兩段然後將正確解答案號數填入括號內) 20%

Get acquainted with the doctor you have decided upon. The most direct way is to make an appointment, perhaps for a routine check-up, and at this time ask him about his training and experience, his specialty, if any, his teaching connections, whether he is on the staff of a hospital. Feel free to ask him, too, about his fees and whether he makes night calls.

A. We can get acquainted with the doctor……( )
❶ by inviting him to see a movie.
❷ by sending a present to his wife.
❸ by making an appointment with him.
❹ by writing a letter to him.

B. We feel free to ask him about……( )
❶ his riches. ❷ his children. ❸ his patients. ❹ his fees.

A scout does not run away or call for help when accident occurs. If a person is cut he knows how to stop the flow of blood and gently and carefully bind up the wound.

A. When accident occurs a scout will……( )
❶ run for his own life. ❷ call loudly for help.
❸ lie down quietly. ❹ not run away or call for help.

B. If a person is cut he knows……( )
❶ how to tell him a story. ❷ how to clean the blood stains.
❸ how to call for help. ❹ how to stop the flow of blood.

## 省立臺南第二中學

Ⅰ Fill the blanks below (填空白) : 20%

❶ Dinner is going to be_____fifteen minutes_____seven.
❷ I go_____the street to meet my friend.

❸ If it_____rain, I could not go.
❹ Mary is an American,_____she speaks very good Chinese.
❺ The woman_____is with her son is my aunt.
❻ I do not know_____he will write a letter_____not.
❼ His father is a soldier_____judge.
❽ My father prevented me_____leaving.
❾ He has been robbed_____both his money and his clothes.
❿ Can you point out the difference_____meaning _____these two phrases?

Ⅰ Correct the errors below (改錯) : 20%
❶ Flour is made of wheat.
❷ I am surprised with your rude conduct.
❸ I afraid of meeting your stern uncle.
❹ We do not feel the earth to move under us.
❺ She looks kindly and beautifully.
❻ Your story cannot scarcely be true.
❼ To-day is a coldest day of the year.
❽ Our room is bigger and more cleaner than your.
❾ The hen protects his young under his wings.
❿ Has your book found?

Ⅱ Underline the correct words in the following parentheses.
(在下列括弧中正確的字下劃一條線) : 20%
❶ Every boy and girl (love, loves) to ride bicycle.
❷ John or James (has, have) been asked to speak a few words.
❸ This book (must, has to) be a good one for many students are buying it.
❹ She (set, sat) her baby in the cradle.
❺ He is (laying, lying) under the tree.
❻ He spends (much, many) time on his lessons.
❼ Chang went to market (on, by) foot.
❽ I cannot wear this ring because it is (very, too) small for my finger.
❾ Our teacher sent words to everybody, especially you and (I, me).
❿ My grandmother is very old but she has good (teeth, tooth).

Ⅳ Change the voice of the following sentences from active to passive.
(將下列各句由主動語氣變爲被動語氣) : 10%
❶ They began the work yesterday.
❷ I paid him some money for his service.
❸ They are building a new house.
❹ I have worn this uniform for years.
❺ She will sing to to us some new songs.

Ⅴ Rewrite the following sentences in indirect form. (將下列各句再寫成間

接語式）：10%

❶ He said to me, "You are a great friend of mine."
❷ She says, "I am not feeling well today."
❸ "Has your brother came?" he asked me.
❹ "Great hopes make great men" said our teacher.
❺ They replied, "We may not need your help."

Ⅵ Translate the following English into Chinese and vice versa (翻譯) 20%

❶ She sent him to school, where he astonished everyone by his knowledge. He became so famous that he was appointed to a public office at the age of seventeen. When his mother died, a few years later, he left his office and went into mourning for three years at his mother's tombside.
❷ 在家裡，一個童子軍服從他的雙親。
❸ 你看見過飛機嗎？
❹ 我已初中畢業了。
❺ 我的姊姊有兩把刀子。

## 省立臺南女子中學

Ⅰ The following sentences are correct in grammar, but incorrect in meaning. Write "yes" or "no" in the blank at the beginning of each sentence according to its meaning.

❶ _____ The first month of the year is winter.
❷ _____ A blind man can see but cannot walk well.
❸ _____ You should brush your teeth after every meal.
❹ _____ Some day he will swim in the window.
❺ _____ Modern people are accustomed to write on a piece of wood.
❻ _____ The only reason I go to school every day is that I want to make friends.
❼ _____ If a girl is married to your brother, you should call her your sister-in-law.
❽ _____ She has studied so hard that she succeeds.
❾ _____ I am so glad because my mother has been sick.
❿ _____ If he should fail this time, he will try next year.

Ⅱ Strike out the incorrect word in each parenthesis.

❶ His eldest son is (beautiful, handsome).
❷ (May, Can) I sit down, sir?
❸ Your dog is black but (my, mine) is white.
❹ The poor little girl (has been, had been) hungry for three days.
❺ The old man (is lying, is lain) flat on the ground.
❻ She is the (oldest, eldest) student in the class.
❼ China has made great progress in (her, his) industry.
❽ Every morning I hear her (to sing, sing) sweetly.

⑨ The boy (whom, who) you met is called Yang Ching.
⑩ He knows his English lessons very (well, good).

Ⅱ Fill in the blanks with appropriate word.
① We prevent him _____ smoking.
② He is loyal _____ his country.
③ Put your coat on, _____ you will catch cold.
④ I like this book, because it is _____.
⑤ She _____ born in Taiwan in 1940.
⑥ Children are _____ fond of playing with fire.
⑦ This room is larger _____ yours.
⑧ You may shake hands with your friend _____ you are introduced.
⑨ The last month of the year is _____.
⑩ How could you do if your house _____ fire?

Ⅳ Change the underlined words to personal pronouns.
① Do you have a bell on your door?
② She is worried about her lessons.
③ The boy was delighted with these paper boxes.
④ My sister laughed at me, because my face was dirty.
⑤ The room is filled with chairs and desks.
⑥ You ought to speak the truth.
⑦ His brother is a dentist.
⑧ This letter reminds me of my mother.
⑨ The table is covered with a large piece of paper.
⑩ Why didn't you wait for your younger son?

Ⅴ Arrange the following words in correct order and write them in sentence form.
① the the of of is one fly men enemy most dangerous.
② will pen me you that give please.
③ takes off always lady man a a polite his hat to.
④ are are because brothers much they very alike they.
⑤ king wealth power time once a a upon and who had great there was.

## 省立臺南高級工業職業學校

Ⅰ True-False Test:
In the following sentences draw a circle around "yes" if you think it is right and draw a circle around "no" if you think it is wrong. (每小題二分計二十分，做錯倒扣)
下面的句子你認爲意思對的，就在 "yes" 的周圍劃一個圈，你認爲意思錯的就在 "no" 的周圍劃一個圈，例如：

Dr. Sun Yat-sen is the father of The Chinese Republic…… (yes)……no
Mayor Ye Tin Gwei is the principal of Tai-Nan Provincial Girls School ……yes……(no)

❶ Confucius spent his long life of seventy-three years in teaching and in collecting the old writings of the nation. ……yes……no

❷ The most important thing taught by Confucius was the duty of children to love and obey their parents when alive, and to honor and worship them after death. ……yes……no

❸ To see what is right and not to do it, is to be a coward. ……yes……no

❹ Happiness depends on how much money you have. ……yes……no

❺ Clean people spit on the floor because the spit dries like powder and enter human lungs. ……yes……no

❻ Your body needs not rest as mush as it needs food. ……yes……no

❼ China is one of the oldest and largest countries, not only in Asia but also in the world. ……yes……no

❽ The five senses are seeing, heaing, tasting, feeling and smelling. ……yes……no

❾ If a sportsman wins or if he loses, he is always a gentleman…… ……yes……no

❿ It takes about twenty sugar-canes to make one pound of white sugar. ……yes……no

Ⅰ Replace each dash by one of the following phrases : (每小題四分計二十分) 在下面句子中有長劃的地方選擇一適當的片語把牠補充起來。

① fond of ② instead of ③ great many ④ so that ⑤ a pair of

❶ Our teacher has read_____books.

❷ Every bird has_____wings.

❸ Letters are sent by airplanes_____trains.

❹ We eat_____we may live.

❺ He is very_____ reading.

Ⅱ Correct the errors in the following sentences, if there is any. (每小題四分，計二十分) 在下列的句子中如果有錯誤，把它改正過來。

❶ The Chinese soldiers fights bravely. ……( )

❷ Hope is mother of success. ……( )

❸ Every student should be a patriot. ……( )

❹ I bought "The ABC Grammar" under The World Book Company. ……( )

❺ My grandfather love me and I loves him. ……( )

Ⅳ Select the following prepositions and fill in each parenthesis of the sentences with an appropriate one. (每小題四分，計二十分) 選用下列適當的介系詞填入每句的括弧內。

toward, of, at, across, in, between, from.

❶ The sun rises ( ) six in the morning.
❷ The farmer grows many peach trees ( ) his garden.
❸ The kind girl gives money ( ) the poor.
❹ The boat sailed ( ) the sea.
❺ Dr. Sun Yat-sen is the father ( ) The Chinese Republic.

Ⅴ Translate the following English words and phrases into Chinese and vice versa. (每字一分，計二十分) 把下面所列的十個英文字譯成中文，十個中文名詞譯成英文。

❶ honesty ❷ policy ❸ The Book of History
❹ The Book of Change ❺ The Book of Odes
❻ The Spring and Autumn Annals ❼ The Book of Rites
❽ conduct ❾ memory ❿ nation ⓫ 中華民國
⓬ 美利堅合衆國 ⓭ 愛國心 ⓮ 極體主義 ⓯ 大學校長
⓰ 數學 ⓱ 自由中國 ⓲ 國家 ⓳ 人民
⓴ 自由

## 省立工學院附設工業職業學校

Ⅰ Write the Chinese meanings of these words : (20%)

❶ air ❷ business ❸ chemistry ❹ city
❺ daughter ❻ dictionary ❼ education ❽ great
❾ history ❿ newspaper

Ⅱ Fill the blanks with relative pronouns : (20%)

❶ _____the gods love die young.
❷ He told _____he knew.
❸ The girl_____was ill has recovered.
❹ He lost the box of clothes _____I brought.
❺ Is this the picture_____you will give me?

Ⅲ 將下列各字句譯成英文 (20%)

❶ 中華民國萬歲！ ❷ 我愛中華民國。 ❸ 我們的學校放假了。
❹ 老師！我可以出去嗎？ ❺ 昨天他們去游泳。

Ⅳ Correct the following sentences : (20%)

❶ I was born in July 4th, 1937. ❷ You are as tall as me.
❸ You two should help each other. ❹ I drink many water.
❺ Is the wind blow now?

Ⅴ 回答下列各問題 (20%)

❶ What time is it now? ❷ Are you a student?
❸ What color is the sky?
❹ How long have you studied English? ❺ Are you busy to-day?

## 臺南市私立長榮中學

I Correct the following sentences:

❶ You and I am good friends. ❷ She looks pleasantly.
❸ One of these books are mine. ❹ He did not came here yesterday.
❺ You are taller than me. ❻ This is the best of the two boys.
❼ Either you or he are a liar. ❽ I done this work myself.
❾ Let me to speak a little. ❿ We ought work hard.

II Fill in each of the following blanks with a proper word:

❶ I go _____ school every morning.
❷ This is the place _____ we study.
❸ We come here _____ visit our friends.
❹ I am fond _____ reading.
❺ We all live _____ the earth.
❻ This is the man _____ I saw yesterday.
❼ She has a book _____ is very interesting.
❽ I sent _____ a doctor. ❾ They take lunch _____ noon.
❿ Put it _____ the table.

III Change the following sentences from the active voice to the passive voice and vice versa.

❶ He asked me a question. ❷ A bird is seen by me.
❸ She is writing a letter. ❹ I have bought a pencil.

IV Translate the following sentences into Chinese:

❶ He is a very learned man. ❷ You are a man of millions.
❸ Men eat to live, but do not live to eat.
❹ China is our native land.
❺ Reading newspapers everyday can increase one's common knowledge.

V Translate the following Chinese into English:

❶ 他是一個誠實的人。 ❷ 你歡喜游泳嗎？
❸ 我已經學過三年英語。 ❹ 明天我們將要去臺北。
❺ 你來時，我正在打網球。

## 省立高雄中學

I Correct the following errors: (24%)

❶ He has tolds them a story.
❷ She will go to the city yesterday.
❸ We do not feel the earth to move under us.
❹ The children, play their games, made much noise.
❺ He can neither read or write.
❻ The little girl who you see is my sister.

❼ My table's leg is broken.
❽ Myself saw the thief enter.

Ⅱ Fill the following blanks: (16%)
❶ Do you know _____ he is going? (where, what, which, that)
❷ This man is poor _____ he is honest. (as, that, but, till)
❸ I shall remain _____ you come. (and, till, for, nor)
❹ We have no water _____. (drink, drinking, to drink, drank)
❺ There _____ twenty students in our class. (is, am, shall be, are)
❻ John is _____ of the three. (stronger, strongest, the strongest, strong)
❼ He had to choose _____ death and dishonour. (among, under, with, between)
❽ These are those _____ coats. (girls, girl's, girls', girl')

Ⅲ Change each present tense in these sentences to the past tense : (16%)
Thus: John is a very active boy. John was a very active boy.
❶ I am sure that he is absent.
❷ It is an interesting book, but I can not read it.
❸ The man nods his head and doesn't say a word.
❹ They fight a good fight.
❺ Mrs. A tells her son not to be afraid.
❻ The sky is as dark as it can be.
❼ I open the window that I may see the moon.
❽ You tell me to go home as quickly as possible because it is getting late, and I think it will be wise to follow your advice instead of delaying any longer.

Ⅳ Change the following quotations from direct into indirect, and vice versa : (8%)
Thus: He says, "I am wrong." He says that he is wrong.
❶ He said, "It will rain."
❷ My friend wrote me that he was coming to see me.
❸ He said, "Come in."
❹ He told me that failure is the mother of success.

Ⅴ Translation : (36%)
❶ At first he seemed to find English very difficult, but later he made very good progress.
❷ The teacher told us to look at the blackboard and not at our books.
❸ The doctor says that he must lie down and rest for an hour every afternoon.
❹ You will have to pay more attention in class if you wish to get a better mark.
❺ 你看見那朵花嗎？它多美麗呵！ ❻今天天氣很好，我們到公園去散步。

❼ 昨夜有幾個朋友來看我們。 ❽ 我對了又等，他來了。

## 省立高雄女子中學

I Vocabulary :

(a) Translate the following words into English: (10%)

❶ 責任 ❷ 困難 ❸ 想像 ❹ 勝利 ❺ 自由
❻ 飛機 ❼ 教育 ❽ 公共汽車 ❾ 勇敢的 ❿ 財產

(b) Translate the following words into Chinese : (10%)

❶ learn ❷ advantage ❸ department ❹ submarine
❺ stroll ❻ meal ❼ ignorant ❽ different
❾ remember ❿ again

II Fill the following blanks with appropriate words : (10%)

❶ I am fond _____ playing tennis.
❷ Both you _____ he are Chinese.
❸ The young girl is taller than _____.
❹ They all laughed _____ the poor boy, when he ran after his hat.
❺ I wonder _____ old he is.
❻ You ought _____ study diligently.
❼ The kind man gave _____ his seat to the old woman.
❽ The cat runs _____ than the mouse.
❾ I eat the apple instead _____ the orange.
❿ His family depends _____ him for support.

III Correct the mistakes in the following sentences : (10%)

❶ Your friend don't know that man.
❷ We have study English for three years.
❸ I heard him to talk with his father.
❹ The letter wrote in red ink.
❺ You must bear these wise sayings at your mind.
❻ He is a greatest scholar who ever lived.
❼ We are Chineses and should love each other.
❽ Have you some money? ❾ She go to school everyday.
❿ I bru h tooth every morning

IV Tell the uses of these words, phrases, and clauses (underlined) in the following sentences : (20%)

Ex. One of the boys has a book.
(one ..... subject) (book ..... object)

❶ My father was the oldest man in the town.
❷ The young man swam across the river.
❸ The man who makes clothes is a tailor.
❹ The roof of this house is made of aluminum.

❺ To love our enemy is a great teaching of Jesus Christ.
❻ These apples are yours and those are mine.
❼ Smiling babies win hearts long hardened by life's toil.
❽ I began to ride my bicycle.
❾ The playing children made much noise.
❿ After thinking the matter over, I gave him some money.

V Translate the following sentences in English : (20%)

❶ 我們應該愛我們的國家。
❷ 你家裡有幾個人？
❸ 我每天早晨五點半起身。
❹ 太陽比月亮大得多。
❺ 已所不欲，勿施于人。

VI Answer the following questions : (20%)

❶ Where do you come from?
❷ How many seasons are there in a year?
❸ Do you speak English or Chinese?
❹ How long have you been in Taiwan?

## 省立高雄工業職業學校

I Correct the following with pen, crossing out the wrong word when two are given : (40 marks)

❶ I wish she (was, were,) here.
❷ The boy or the girl (come, comes,) out.
❸ He has (laid, lain) it down.
❹ The bird has (broke, broken) its wing.
❺ Both tried, but neither of them (have, has) succeeded.
❻ Shakespeare is the greatest poet (which, that) England has ever had.
❼ I approve (him, his) doing it.
❽ He feels (bad, badly) about.
❾ It looks (good, well) to me.
❿ I (shall, will) go in spite of the rain.

I Put into Chinese : (30 marks).

a) Probably no story is better known all over the world than that of Robinson Crusoe. It is just as interesting to the Chinese boy or girl as it is to the English boy or girl. Not only children but also grown-up people love to hear or to read the adventures of the man who spent twenty-three years quite alone on an island.

b) The greater part of the story tells us how Crusoe found shelter and food, how he built his "Castle", how he made his furniture and clothes, and how he taught himself many trades and became expert in doing all sorts of useful things.

I Fill each blank with an appropriate word. (30 marks)

❶ We arrived_____the theater ten minutes early.
❷ Our plans for tomorrow_____on the weather.
❸ I don't agree_____him on that.
❹ The best government is the government_____the people_____ the people_____the people.
❺ Although they were outlaws and robbers, they were_____cruel _____bad men.
❻ I spend a lot_____time_____it.
❼ You knew_____you_____done wrong.
❽ I_____going to_____post-office.
❾ We must fight_____communist.

## 省立高雄商業職業學校

A. If the statement is correct, put "○" in the parentheses. If it is incorrect put "×". (10%)

❶ We call the small building a skyscraper..... ( )
❷ "Exit" means the way in an "Entrance" means the way out.... ( )
❸ A botanical garden has a large collection of animals..... ( )
❹ The greenhouse is a house for men to live in..... ( )
❺ The short hand of a clock shows the minutes and the long hand shows the hours. ..... ( )
❻ By telescopes, we can see the stars that are many millions of miles away..... ( )
❼ Motion pictures move very rapidly on the screen. ..... ( )
❽ The sun comes up in the morning. ..... ( )
❾ A quarter of an hour is one fourth of an hour. ..... ( )
❿ We can make an announcement by a loudspeaker. ..... ( )

B. Correct the errors. (20%)

❶ How many finger have you? ❷ The sun go down in the evening.
❸ I wish I can fly. ❹ There are many sheeps.
❺ It is a object. ❻ He is a honest man.
❼ They waited to sunset. ❽ There is no quarrel among you and me.
❾ He will join us since tomorrow.
❿ He is my brother whom is a good boy.

C. Fill in the blanks with appropriate words (10%)

❶ I am very fond_____reading.
❷ The cup is full_____water.
❸ Will you please read these words one_____one?
❹ You should do according_____the rules.

❺ Instead_____working, he plays all day.
❻ This pencil differs_____that.
❼ I cannot agree_____your proposal.
❽ They set out in search_____the lost child.
❾ They struggled_____vain.
❿ In regard_____this business, I will tell you later.

D. Choose the right word in the parentheses in the following sentences: 10%
❶ They had plenty (of, in) food. ❷ He laughs (at, to) me.
❸ The war began (in, on) 1939.
❹ Chinese is different (from, as) English in the way of writing.
❺ Every school (have, has) a Sports Day.

E. Give the past and past participle verbs: (20%)

| Present | Past | Past participle | Present | Past | Past participle |
|---|---|---|---|---|---|
| study | _____ | _____ | know | _____ | _____ |
| do | _____ | _____ | give | _____ | _____ |
| see | _____ | _____ | lie | _____ | _____ |
| read | _____ | _____ | put | _____ | _____ |
| become | _____ | _____ | send | _____ | _____ |

F. Give the comparative and superlative degree of the following words: 10%

| positive | comparative | superlative | positive | comparative | superlative |
|---|---|---|---|---|---|
| small | _____ | _____ | close | _____ | _____ |
| happy | _____ | _____ | good | _____ | _____ |
| little | _____ | _____ | hot | _____ | _____ |
| big | _____ | _____ | useful | _____ | _____ |
| bad | _____ | _____ | many | _____ | _____ |

G. Give the plurals of the following nouns: (10%)
friend grass woman body mouse foot
piano monarch handkerchief birthday herself

H. Change the following from the active voice into the passive voice: 10%
❶ They see a dog: ❷ I wrote a letter. ❸ He will teach me.
❹ He has taught us. ❺ I told her a story.

## 省立屏東中學

I (a) Put + in ( ) after each of the correct word and − in ( ) after each of the incorrect word: 10%

| | | | | | |
|---|---|---|---|---|---|
| ❶ cann't ( ) | ❷ gril ( ) | ❸ tomorow ( ) |
| ❹ believe ( ) | ❺ robed ( ) | ❻ haveing ( ) |
| ❼ skillful ( ) | ❽ freind ( ) | ❾ beautiful ( ) |
| ❿ neighbour( ) | | |

(b) Give the opposite of each of the following words: 10%

❶ within ❷ lazy ❸ never ❹ slowly
❺ open ❻ sell ❼ early ❽ wife
❾ hero ❿ up

I (a) Give the comparative and the superlative of: 5%

❶ happy _____ _____ ❷ fat _____ _____
❸ difficult _____ _____ ❹ old _____ _____
❺ splendid _____ _____

(b) Give the past and the past participle of: 5%

❶ eat _____ _____ ❷ see _____ _____
❸ know _____ _____ ❹ come _____ _____
❺ lose _____ _____

(c) Give the plural of: 5%

❶ tooth _____ ❷ city _____ ❸ half _____
❹ piano _____ ❺ box _____

I (a) Change the voice of the following verbs: 15%

❶ A car ran over the child.
❷ The questions are answered by him and me.
❸ This book was written by me.
❹ He has caught a fish.
❺ We shall learn a new lesson.

(b) Combine the following pairs of sentences into simple ones by means of relative pronouns: 15%

❶ I have lost the watch. I bought the watch yesterday.
❷ That is the man. I met him yesterday
❸ He brings a book. The book belongs to me.
❹ The book is yours. The book is on the desk.
❺ John is a boy. He works hard.

IV Correct the following sentences: 20%

❶ He is mine friend, faithful and just to I.
❷ His sister invited we to visit hers.
❸ Who do you see in the school?
❹ I am read just now.
❺ Have you ever saw a lion?
❻ We have study English for two years.
❼ There was some boys in the garden.
❽ Don't jump after eat.
❾ You are powerfuler than he.
❿ Let him to come.

V Turn the following sentences into English. 15%

❶ 他同你一樣高。 ❷ 你住在何處？
❸ 昨天我在街上 (street) 遇見她。 ❹ 他不及你聰明。

⑤ 我歡喜他，但是他不歡喜我。

Construct five sentences in which each of the following words or phrases is used:

① look at ② afraid of ③ bought ④ read ⑤ many

## 省立屏東女子中學

A. Tell the different meanings of each of the following words.
(A. in English. B. in Chinese)

a. ① 夏季 ② 數學 ③ 國家 ④ 春天 ⑤ 健康
⑥ 早餐 ⑦ 甘蔗 ⑧ 責任 ⑨ 滿足 ⑩ 家庭

b. ① mosquito ② freedom ③ politeness ④ spoon
⑤ handsome ⑥ China ⑦ examination ⑧ junior middle school
⑨ telephone ⑩ birthday

B. Answer the following questions:

① When do you get up in the morning?
② What is the name of your school?
③ How many years have you learned English?
④ Do we Chinese drink tea with sugar and milk in it?

C. Correct the errors in the following sentences:

① He give me two box of candy.
② We all live in the earth.
③ He tell me a story.
④ He have five books.
⑤ We have not water drink.
⑥ Please come and play with we.
⑦ I not like him.
⑧ You and I am students.
⑨ Can I help you?
⑩ Have you got some paper?

D. Fill in the blanks:

① Work_____you work, play_____you play.
② We should pay attention_____world affairs.
③ The girl is_____kind_____diligent.
④ We write_____our hands.
⑤ He neither drinks_____smokes.
⑥ We_____a good time yesterday.
⑦ Is your father_____home?
⑧ If you feel_____go for a walk.
⑨ I_____a Chinese.
⑩ I like history_____than anything else.

E. Translate five sentences into English in the following:

① 我可以進來嗎？
② 明天我要來拜訪你。
③ 我是一個好學生。
④ 我們都是中國人，所以我們說中國話。
⑤ 我很高興看見你。
⑥ 我母親愛我。
⑦ 你到那裡去？
⑧ 請給我一杯水。
⑨ 一星期有幾天？
⑩ 你的哥哥幾歲了？

# 省立屏東農業職業學校

I Give the meaning of the English words in Chinese and vice versa : (譯字) (20%)

| 英譯中 | | | 中譯英 | |
|---|---|---|---|---|
| ❶ corn | ❷ expect | ❸ usually | ❹ temperature | |
| ❺ elephant | ❻ birthday | ❼ garden | ❽ farmer | |
| ❾ breathe | ❿ weather | ⓫ 七月 | ⓬ 風暴 | |
| ⓭ 忘記 | ⓮ 何處 | ⓯ 打電話 | ⓰ 重要的 | |
| ⓱ 旅行 | ⓲ 服從 | ⓳ 正常的 | ⓴ 懂得 | |

I Blanks (填充) (20%)

❶ _____he come to school every day?
❷ He is_____best student in our class.
❸ I am_____than you.
❹ She sings_____.
❺ This letter has been_____by me.
❻ I_____not afraid of the English Examination.
❼ She loved him as much_____he was worthy.
❽ He_____asking for your help.
❾ I know what you want_____do.
❿ There was a merchant_____owned a store.

I Correct the errors : (改錯) (20%)

❶ When the bell ring the pupils go into the classroom.
❷ This are not a suitable answer.
❸ I have haring nothing from him since his departure.
❹ Since you say so, it must to be true.
❺ Many things are making of silk.
❻ I meet her in the class yesterday.
❼ I give the book to he.
❽ It may be a egg of some kinds.
❾ Sheep are very use animals.
❿ Come here quick.

IV Make sentences with each of the following : 造句 (20%)

❶ better than ❷ run ❸ between
❹ by and by ❺ not only……but

A Translate into Chinese : (譯成中文) (20%)

Plants need rain. They need sunlight and they also need soil. There are many kinds of soil. One kind soil is sticky in wet weather. That kind soil is called clay. Another kind of soil is nearly all sand. Rain soon runs through that kind of soil. Soil always contains rotted leaves and bits of dicayed plants.

## 省立花蓮中學

I Translate the following words.

A. into Chinese, (10%)

❶ jar ❷ mosquito ❸ bicycle ❹ health ❺ harbour

B. into English (10%)

❶ 火車 ❷ 演員 ❸ 帝國 ❹ 音樂 ❺ 革命

II Fill each of the following blanks with the suitable one of the given words; at, in, on, then, than, to, with, without. (10%)

❶ She wants you_____come.

❷ He is interested_____this book.

❸ I quite agree_____him.

❹ I like you better_____he does.

❺ All the stndents look_____the black board.

III Correct the mistakes in the following sentences. (10%)

❶ Let him goes!

❷ The men who stand in the street is my brother.

❸ What you are doing?

❹ Why do you came late last night?

❺ He study hard.

IV Change each of the following sentences from Direct into Indirect Speech. (20%)

❶ Judoh said, "what shall we gain if we kill our brother?."

❷ She said, "I am a hen." ❸ John says, "I hate him."

❹ She said, "I love him as much as I do myself."

❺ Mary said, "I was there."

V Translate the following sentences into Chinese (20%)

❶ The man went on day after day, week after week, saying nothing but the same words.

❷ Airplanes today are much better than that first one, but even today most planes are made more or less like it.

VI Translate the followiug sentences into English (20%)

❶ 回答這個問題並不難。 ❷ 他不但誠實而且聰明。

❸ 我已經讀了三年英文。 ❹ 我要努力讀書。

## 省立臺東中學

I Supply each blank with the correct form of the verb. (20%)

❶ Mary always_____(walk) to school. ..... ( )

❷ Tom_____(come) here yesterday. ..... ( )

❸ The sun_____(shine) now. ..... ( )

❹ She_____(visit) me many times. ( )
❺ Father_____(tell) us the same story this morning. ( )
❻ His mother said that he_____(leave) there the day before yesterday. ( )
❼ I_____(sleep) when she came. ( )
❽ Both Tom and Jane_____(be) here tomorrow. ( )
❾ By this time next week, he_____(forget) all about it. ( )
❿ She_____(live) in Taitung since 1948. ( )

Ⅰ Fill the blanks with suitable relative pronouns: (10%)
❶ This is the boy_____I know. ( )
❷ I don't understand_____he says. ( )
❸ This is the man_____built the house. ( )
❹ This is not the book_____I want. ( )
❺ The pencil_____point was broken has been re-sharpened. ( )

Ⅱ Change the verbs either from the active to the passive or from the passive to the active.: (10%)
❶ A good boy is loved by everybody.
❷ Most of her friends laughed at her.
❸ I have finished the letter.
❹ He will do the work.
❺ She is writing a letter.

Ⅳ Correct the errors in the following sentences: (10%)
❶ English is a easy language. ( )
❷ Does he likes this book? ( )
❸ She is my older sister. ( )
❹ She has a friend whom is a teacher. ( )
❺ Last week he tells me a story. ( )
❻ The man who came to see us yesterday dead. ( )
❼ There is once upon a time a man in the hill. ( )
❽ Can you to ride a bicycle? ( )
❾ The boy has breaking a cup. ( )
❿ I wrote my name on the book's cover. ( )

Ⅴ Put "○" in the parentheses if the statement is correct in fact. Put "×" if the statement is not correct in fact.: (10%)
❶ A quarter of an hour is one fourth of an hour. ( )
❷ All the players in a football game may use their hands. ( )
❸ Cotton grows in cold countries, where no rain falls. ( )
❹ A sound sleep during the night has nothing to do with good work the next day. ( )
❺ Passengers buy their tickets from the booking office. ( )
❻ "Oxen" is the plural of "ox". ( )

❼ A transitive verb may have two objects. ( )
❽ A leap year has three hundred and sixty-six days. ( )
❾ The moon is much nearer to us than the sun. ( )
❿ When some parts of the earth are facing the sun, they will have warm weather. ( )

Ⅵ Change the nouns in the parentheses from the singular into the plural: (5%)

❶ She has three new (watch). ( )
❷ His (tooth) are not clean. ( )
❸ We caught two (thief) last night. ( )
❹ A tree has many green (leaf). ( )
❺ There are many (sheep) in the field. ( )

Ⅶ Give the feminine gender of the following masculine nouns.: (5%)

❶ gentleman ( ) ❷ uncle ( )
❸ he-goat ( ) ❹ ox ( )
❺ father-in-law ( )

Ⅷ Choose the correct form in the parentheses below.: (5%)

❶ How do you know (they, them, their) are Americans? ( )
❷ The boy (who, whose whom) was lazy was punished. ( )
❸ I am much (good, better, best) than yesterday. ( )
❹ It is right (telling, to tell, told) the truth. ( )
❺ I (studied, study, was studying) last night when you called. ( )

Ⅸ Match the words in column B with the meanings that are given in column A.: (10%)

Example: A B
alike ( 2 ) ❶ to look at
once ( 3 ) ❷ in the same form
see ( 1 ) ❸ once upon a time

finally ( ) ❶ without any effect
journey ( ) ❷ candy
much ( ) ❸ to take care of
look after ( ) ❹ pay attention to
shore ( ) ❺ at last
tiny ( ) ❻ sea
watch ( ) ❼ a deal of
sweet ( ) ❽ small
in vain ( ) ❾ edge of land near a sea or an ocean
ocean ( ) ❿ travel from one place to another

Ⅹ Translate the following sentences into English.: (15%)

❶ 她住在臺北已經五年了。 ❷ 他常常遇見王先生。
❸ 她昨晚來時我正在讀英語。 ❹ 我去年教他中文。
❺ 你能寫英文信嗎？

## 省立馬公中學

I Make five sentences by using the following phrases :
❶ fond of ❷ in the morning ❸ a great deal
❹ not only……but also ❺ like……best

II Correct the following sentences :
❶ I is a student. ❷ She give he a pen.
❸ He have two brother. ❹ There is many pupils in this room.
❺ I will be very glad if you come to see me.
❻ The letter is wrote by she sister. ❼ He study very hard.
❽ If I am you, I would not go.
❾ Have you finish you lesson? ❿ He is much good than I.

III Fill in the blanks with appropriate words :
❶ I wake_____early in the morning.
❷ He ran as fast_____he could. ❸ It is_____old mouse.
❹ I cannot agree_____him.
❺ This garden is full_____trees.

IV Translation.
❶ Translate the following sentences into English :
① 我是一個中國的學生。 ② 我有一本新書，我非常喜歡它。
③ 他問我「明天你來嗎？」 ④ 你怎麼知道他是一個外國人？
⑤ 我愛我的國家。
❷ Translate the following paragraph into Chinese :
I am very glad to accept your kind invitation to dinner at Shanghai Restaurant, next Tuesday at 7 o'clock. I am looking forward to see you.

# 數學科試題

## 省立臺北工業專科學校

註意：①不必抄題，惟須寫明題次，並須順次演算。
②由1到7每一小題6分滿分，第8題每一小題8分滿分。

1 分解因式：

(a) $x^4+4$ (b) $x^2+y^2+2xy+8x+8y-9$

2 化簡：

(a) $\dfrac{\dfrac{a}{x}-\dfrac{x}{a}}{a-\dfrac{x^2}{a}}$ (b) $3\sqrt{20}+5\sqrt{\dfrac{1}{5}}-\dfrac{1}{3}\sqrt{45}-2\sqrt{80}$

3. 演算下列方程式：

(a) 解聯立方程式

$$\begin{cases}\dfrac{2}{x}+\dfrac{3}{y}=\dfrac{29}{35}\\ \dfrac{5}{x}-\dfrac{1}{y}=\dfrac{6}{7}\end{cases}$$

(b) 應用比例定理

解 $\dfrac{x-9}{x-12}=\dfrac{x-21}{x-33}$

4 計算：

(a) 已知方程式 $(100+3k)x^2-44x+4=0$ 的兩根相等，求 $k$ 的值。

(b) 設二次方程式之二根爲 $3+\sqrt{2}$ 與 $3-\sqrt{2}$，求其原方程式。

5. 解答下列級數問題：

(a) 求 $(x+y)^2$ 與 $(x-y)^2$ 的等差中項。

(b) 在 $\frac{1}{8}$ 與128中間，插入4個等比內項。

6. 求證：

(a) 設 $CD$ 是直角三角形 $ABC$ 之斜邊上的高，試證 $\angle ACD=\angle B$。

(b) 試證梯形的中線等於二底和的一半。

7. 求證：

(a) 用等腰三角形一腰做直徑的圓，必平分等腰三角形的底邊。

(b) 二圓外切，過切點作直線，二圓相交，則從交點各作圓的直徑必互相平行。

8. 作圖與計算：

(a) 求作一正方形，等於已知正方形的兩倍。

(b) 設內接正三角形的面積是 $12\sqrt{3}$ 方寸，試求圓的半徑。

## 省立臺北師範學校

一、是非題：（對的畫「○」字，錯的畫「×」字）20%

❶ 圓周的長等於半徑的 $\pi$ 倍。……（ ）
❷ 本金＝複利息÷〔(1＋利率)期數－1〕……（ ）
❸ $0.\dot{1}0\dot{8}=\frac{108}{999}=\frac{4}{37}$ ……（ ）
❹ $x^2+y^2=(x+y)^2$……（ ）
❺ $a^{\frac{n}{m}}=\sqrt[n]{a^m}$ ……（ ）
❻ $(x+i)(x-i)=x^2-1$……（ ）
❼ 如級數各項之倒數成等比級數者，則稱爲調和級數。……（ ）
❽ 平行四邊形之對角線相等。……（ ）
❾ 內接於圓之梯形，必爲等腰梯形。……（ ）
❿ 二相似多邊形周圍之比，等於任意二對應邊之比。……（ ）

**二、填充題：** (30%)

❶ 216，360，504的 *G. C. M.*＝_____。
❷ $2.\dot{3}-0.1\dot{8}\dot{2}\dot{5}=$_____。
❸ 鵝2隻換雞5隻，雞3隻換鴨6隻，鬥鴨15隻，可換鵝_____隻。
❹ $\sqrt{-a}\times\sqrt{-b}\times\sqrt{-c}=$_____
❺ 分解 $6x^2-19x+15$ 的因式_____。
❻ 分解 $2x+ax^2-2a^2x-4a$ 的因式_____。
❼ 無窮等比級數 $1+\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\cdots\cdots$ 的總和等於_____
❽ 三角形三中線相交於一點，此點稱爲_____，此點與各頂點的距離等於各中線的_____。
❾ 六角形諸內角之和等於_____直角，諸外角之和等於_____直角。
❿ 自圓外一點作一切線及一割線，則此切線之長，爲割線全長及圓外一段之積之_____。

三、將糖果分給兒童，每人5粒，多3粒，若有兩人各給4粒，其餘各給6粒，恰好分完，求人數和糖果數。（必需用算術解7%）

四、有一工程，甲獨做，五日可成，乙獨做8日可成，問二人合作幾日可成。（必需用算術解8%）

五、求下列各題之結果（10%）

*a.* $\sqrt{-50}-\sqrt{-18}+\sqrt{-8}$

*b.* $\dfrac{\sqrt{2}}{\sqrt{7}-\sqrt{3}}$

六、解聯立方程式 $\begin{cases}x^3-y^3=189\\x^2+xy+y^2=63\end{cases}$ （10%）

七、連結三角形三邊中點所成的三角形，和原三角形相似。（7%）

八、以等腰三角形之一腰爲直徑作圓，求證圓周必平分底邊。（8%）

# 省立臺北女子師範學校

**I　是非題**：判別下列各題的是非，對的在下面括號內填(＋)，錯的填(－)「註：本題每作對一條得2分，錯一條反扣2分」

❶ $0.27135=\frac{27135}{99999}$ ……（　）

❷ $\frac{(\text{上底}+\text{下底})\times\text{高}}{2}=$梯形的面積……（　）

❸ 三角形的面積×2÷底＝高……（　）

❹ 1方公里＝1000方公尺……（　）

❺ (兩數之和＋兩數之差)÷2＝大數……（　）

❻ 括號前面是減號，去括號後，括號內各數的符號不必改變。……（　）

❼ $x^3+y^3=(x+y)(x^2+xy+y^2)$……（　）

❽ $5\sqrt{x}+4\sqrt{x^2}-6\sqrt{x^3}=3\sqrt{x^2}$……（　）

❾ 方程式 $ax^2+qx+c=0$ 的兩根是 $\frac{-b\pm\sqrt{b^2-4ac}}{2}$……（　）

❿ $(a^n)^m\times(a^p)^n=a^{n(m+p)}$……（　）

⓫ $(x^m)^p\div(x^n)^m=a^{m(p-n)}$……（　）

⓬ $i^7\times i^5=-i$……（　）

⓭ 三角形，四角形，五角形及多角形的諸外角和，都等於四直角……（　）

⓮ 過圓上一點，可作很多條切線。……（　）

⓯ 兩三角形中若有兩角彼此相等，則此兩三角形必相似。……（　）

**I　填充題**：把適當的字母，數字或語句，填在括號內，「註：作對一題得2分」

❶ 計算含有「＋」，「－」，「×」，「÷」各種符號的式子，必須先計算（　）再計算（　）

❷ 直徑乘（　）＝圓周

❸ $x^0=$（　）

❹ $a^{-5}=$（　）

❺ 時計速度是分針速度的（　）

❻ 在 $y=f(x)=5x-15$ 中，自變數是（　），函數是（　）

❼ $a^5-b^5=$（　）$(a^4+a^3b+a^2b^2+ab^3+b^4)$

❽ $(\sqrt[n]{x}\times\sqrt[n]{y})^n=$（　）

❾ 設 $x$ 是 $a$, $b$ 的等比中項，則 $x=\pm$（　）

❿ $\sqrt{-4}\times\sqrt{-9}=$（　）

⓫ $(a+bi)(a-bi)=$（　）

⓬ 多角形之邊數爲 $n$ 時，其諸內角之和爲（　）

⓭ 三角形三邊上的中線，必相交於（　）

⓮ 垂直於一弦的直徑，必平分此弦及此弦所對的（　）

⓯ 直角三角形有一銳角是他角的2倍則（　）是最短邊的（　）

**I　計算題**：「註：每作對一題得5分」

❶ 初中三年級學生32人，恰爲初中二年級學生的$\frac{4}{7}$，問二年級有多少人？

❷ 放在分格碗橱裏的菜碗225隻，飯碗360隻，每格菜碗和飯碗數目各自相等，問這碗橱最多有幾格？

❸ 求 $x^6-3x^5+5x^3-3x-1$ 之立方根

❹ 解方程式 $x^2+6x-16=0$

Ⅳ **證明題**：「註：每題10分」

❶ 連接任意四邊形中點的線段，必成一平行四邊形。

❷ 求證於兩圓公切線上的任一點，向兩圓各作切線，則兩切線相等。

## 省立臺北第一女子中學
## 省立臺北第二女子中學 } 聯合招生
## 省立板橋中學（女子組）

**一、選擇題**（每題一分，共五十題）

**作法** 下面共有數學科選擇題50題，每題有四個答案，在四個答案之中，有一個是對的，或是四個都不對。請仔細選擇。

例一：三角形三角的和等於 ①四直角 ②三直角 ③二直角 ④一直角

正確的答案是「二直角」它是第③號，所以在答案紙上例一後面第③號圓圈裡畫了一個加號（＋）。再看例二。

例二：$(a+b)^2$ 等於① $a^2+b^2$ ② $a^2+2ab+b^2$ ③ $a^2-b^2$ ④ $a^2-2ab+b^2$

正確的答案是 "$a^2+2ab+b^2$"，它是第②號，所以在答案紙例二後面第②號圓圈裏畫了一個加號（＋）。再看例三。

例三：1+5 等於① 8 ② 9 ③ 20 ④ 11

這四個答案中沒有一個是正確的，所以就在答案紙上例三後面第（。）號圓圈裏畫了一個加號（＋）。這便是作答案的方法。不用你寫字，祇要在適當的圓圈裏作個加號（＋）就行了。

❶ 三角形三中線的交點叫做_____

① 內心 ② 外心 ③ 旁心 ④ 垂心

❷ 二直線同垂直於一直線則此二線_____

① 垂直 ② 平行 ③ 相交 ④ 相重

❸ 圓的切線垂直於過切點之_____

① 半徑 ② 弦 ③ 切線 ④ 割線

❹ 正多角形的面積等於周界與_____乘積的一半。

① 弦心距 ② 頂心距 ③ 邊心距 ④ 高

❺ 二圓的連心線等於半徑的和則此二圓心_____

① 相交 ② 內切 ③ 相含 ④ 相離

❻ 直角三角形的一銳角等於他一銳角的兩倍，則短的直角邊等於斜邊的_____

① $\frac{1}{5}$ ② $\frac{1}{4}$ ③ $\frac{1}{3}$ ④ $\frac{2}{3}$

❼ 圓內兩弦相交所成的角可所截相對兩弧之和的_____去度它

① 2倍 ② 1倍 ③ $\frac{1}{2}$倍 ④ $\frac{1}{3}$倍

⑧ 相似多角形面積的比等於其對應邊的_____

① 立方比 ② 平方比 ③ 平方根比 ④ 立方根比

⑨ 正 $n$ 邊形每一內角是_____

① $\frac{2(n-5)}{n}$直角 ② $\frac{2(n-4)}{n}$直角 ③ $\frac{2(n-3)}{n}$直角 ④ $\frac{2(n-2)}{n}$直角

⑩ 正多角形之一內角爲 108° 則爲_____邊形

① 九 ② 六 ③ 七 ④ 八

⑪ 四邊形的對角線互相垂直平分必爲_____

① 梯形 ② 矩形 ③ 正方形 ④ 菱形

⑫ $\triangle ABC$ 爲內接三角形 $\angle A=40°$，$\angle B=65°$ 則 $\overset{\frown}{AB}$ 含有_____度

① 255° ② 75° ③ 150° ④ 190°

⑬ 任意四邊形相鄰邊中點的聯線必圍成_____

① 平行四邊形 ② 梯形 ③ 矩形 ④ 正方形

⑭ 二個三角形的三邊彼此互相垂直必爲_____

① 全等形 ② 相似形 ③ 等積形 ④ 相等形

⑮ 直角三角形的三邊上作相似多邊形，則斜邊上多邊形的面積 $P$ 與二直角邊上相似多邊形的面積 $Q$, $R$ 有_____關係

① $P>Q+R$ ② $P=Q+R$ ③ $P<Q+R$ ④ $P+Q=R$

⑯ 設兩三角形有一角相等，則面積的比等於_____

① 夾等角兩邊的比 ② 夾等角兩邊平方比

③ 對應邊的比 ④ 夾等角兩邊乘積的比

⑰ $\triangle ABC$ 與 $\triangle A'B'C'$ 中若 $AB=A'B'$ $AC=A'C'$ $\angle A>\angle A'$ 則_____

① $AC>A'C'$ ② $BC>B'C'$ ③ $B'C'>BC$ ④ $A'C'>AC$

⑱ 作圓過兩定點 $A$,$B$, 則圓心之軌跡爲_____

① $AB$ 之平行線 ② $AB$ 之垂直線

③ $\overset{\frown}{AB}$ ④ $AB$ 之中垂線

⑲ 與一定直線距離有定長點的軌跡是_____

① 與定直線之一平行線

② 與定直線之一垂直線

③ 與定直線距離等於定長的一平行線

④ 與定直線距離等於定長的二平行線

⑳ 每邊20公分的正三角形，其高等於_____公分

① $20\sqrt{2}$ ② $20\sqrt{3}$ ③ $5\sqrt{3}$ ④ $\frac{10\sqrt{3}}{3}$

㉑ $(-a)+(+b)=$_____

① $-(b+a)$ ② $-(a-b)$ ③ $-(b-a)$ ④ $(a-b)$

㉒ $\frac{x^2-a^2}{ax}\cdot\frac{a}{x+a}=$_____

① $1-a$ ② $x-a$ ③ $-a$ ④ $\frac{x-a}{x}$

㉔ $9^a 3^b =$ _____

① $27^{a+b}$ ② $3^{a+b}$ ③ $3^{2a+b}$ ④ $9^{a+b}$

㉕ $\sqrt{a^2}+\sqrt{b^2} =$ _____

① $\sqrt{a^2+b^2}$ ② $a+b$ ③ $\sqrt{a^2+2ab+b^2}$ ④ $\sqrt{a+b}$

㉖ $a^0 =$ _____

① 0 ② $a$ ③ $-1$ ④ $1$

㉗ $i^5 =$ _____

① $i$ ② $-i$ ③ $-1$ ④ $1$

㉘ $\frac{x^3-y^3}{x-y} =$ _____

① $x^2+y^2$ ② $x^2-y^2$ ③ $x^2-xy+y^2$ ④ $x^2+xy+y^2$

㉙ $\sqrt{-5}\cdot\sqrt{-4} =$ _____

① $\sqrt{20}$ ② $-2\sqrt{5}$ ③ $+4\sqrt{5}$ ④ $\sqrt{-20}$

㉚ $a^x \cdot a^{-x} =$ _____

① 1 ② $a$ ③ 0 ④ $a^{-2x}$

㉛ $\frac{a}{a-b}-\frac{b}{b-a} =$ _____

① $\frac{a+b}{a-b}$ ② $\frac{1}{a-b}$ ③ $\frac{a-b}{-2b}$ ④ $\frac{ab}{a-b}$

㉜ 一次代數方程式的圖形是_____

① 直線 ② 圓 ③ 雙曲線 ④ 拋物線

㉝ 一元二次方程式的判別式 $b^2-4ac>0$ 時，他的兩根是_____

① 兩個相等實根 ② 兩個不等的實根

② 兩個不等的無理根 ④ 兩個不等的虛根

㉞ $3m^0\times(3m^0) =$ _____

① 9 ② $9m$ ③ $9m^2$ ④ $3m$

㉟ 由 $3l=2m=n$ 求 $l,m,n$ 的連比是_____

① 3 : 2 : 1 ② 3 : 2 : 6 ③ 2 : 6 : 3 ④ 2 : 3 : 6

㊱ $\frac{3-2x+y}{(x-y)(x+y)} =$ _____

① $\frac{1}{x-y}$ ② $\frac{3-2x+y}{x^2-y^2}$ ③ $\frac{3-2x+2y}{x^2-y^2}$ ④ $\frac{3-2x-2y}{x^2-y^2}$

㊲ 設 $a,b,c$ 三數成等差級數則_____

① $b=a+c$ ② $a-b=c-b$ ③ $b=\sqrt{ac}$ ④ $b=\frac{a+c}{4}$

㊳ $2x^2+4x+2$ 與 $x^2-2x-3$ 的 $H.C.F.$ 是_____

① $(x+1)$ ② $(x-3)$ ③ $x^2-2x-3$ ④ $2(x+1)^2$

㊴ $x^2-3x+2$, $x^2-1$ 的 $L.C.M.$ 是_____

① $(x-1)(x+1)(x-2)$ ② $(x^2-3x+2)(x^2-1)$

③ $(x+1)$ ④ $(x-1)(x-2)$

㊳ 解 $x+\sqrt{3x-14}=6$ 則 $x=$_____

① $x=10$ ② $x=-6$ ③ $x=-5$ ④ $x=-10$

㊴ $p-pg(x-y)=$_____

① $p(1-gx-gy)$ ② $pgx-p(y-1)$

③ $p(1-gx+gy)$ ④ $-g(x-y)$

㊵ $\frac{3}{4}\times\frac{5}{6}\times 1\frac{1}{7}\times 1\frac{2}{5}=$_____

① 0 ② 1 ③ $2\frac{1}{31}$ ④ $1\frac{1}{31}$

㊶ 3, 5, 7, 11 是_____

① 因數 ② 質因數 ③ 質數 ④ 連續數

㊷ 2時與3時之間時鐘的兩針何時相重_____

① $27\frac{3}{11}$分 ② $10\frac{10}{11}$分 ③ 2時又$10\frac{10}{11}$分 ④ 2時又10分

㊸ 月利率一分相當年利率多少？_____（依單利計算）

① 1分 ② 0.83分 ③ 1.2分 ④ $\frac{1}{12}$分

㊹ 鐘一隻每天慢3分鐘，幾天以後慢1時30分_____

① 27天 ② 28天 ③ 39天 ④ 30天

㊺ 張家共有8人，每人每日吃米5公兩，問10天吃米多少？_____

① 25公斤 ② $33\frac{1}{3}$公升 ③ 40公斤 ④ 50市斤

㊻ $6\frac{8}{12}:x=3.3:0.75$時 $x=$_____

① $1\frac{17}{33}$ ② $1\frac{1}{2}$ ③ $1\frac{1}{4}$ ④ $1\frac{1}{8}$

㊼ 容量3公石5公斗的空水池，日間注入5公斗水，夜間放出3公斗的水，問經過了幾日可以注滿水池_____

① 第18天 ② 第17天 ③ 第16天 ④ 第15天

㊽ 閏年自一月一日起到四月四月止共有幾天_____

① 94天 ② 95天 ③ 93天 ④ 96天

㊾ 在一定時間內工作量和作工人數成_____

① 反比例 ② 正比例 ③ 複比 ④ 單比

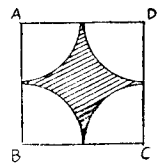
**二、演算題：**（每題五分）

❶ 二圓外切於 $P$，外公切線為 $AB$，試證 $\angle APB$ 為直角。

❷ 求作一圓過一已知點，切一已知直線，且半徑有定長。

❸ 自任意三角形一頂點，向對邊所作的中線小於其他兩邊和的一半。

❹ 若正方形的邊長爲 $a$ 以四頂點爲圓心，$\frac{a}{2}$ 爲半徑向形內作四個弧，求此四個弧所圍成的面積。




❺ 兩個連續奇數中，大數的平方比這兩數的積大38，求這兩數。

❻ 解方程式 $\begin{cases} x+y=5 \\ x^2+y^2=13 \end{cases}$

❼ 如 $p+q:p-q=m+n:m-n$
試證 $p:q=m:n$

❽ 等差級數 9, 13, 17……中第幾項是77。

❾ 一工程甲獨作8日作完，乙獨作12日作完，甲乙合作中途甲因事休息2日，問幾日才能做完？

❿ 把一段布每2.8公尺剪斷，比每3.5公尺剪斷要多4條，這布長多少？

## 省立臺北商業職業學校

**I 是非題**：（是的填○，非的填×，每題一分，錯的倒扣，塗改作廢）

❶ 年利一分的利率高於月利一分的利率。

❷ 售貨七折八扣比八折七扣較便宜。

❸ $a^{m-n}=\frac{1}{a^{m-n}}$

❹ $\frac{(a-b)(e-d)}{(e-f)}(g-h)=(b-a)\frac{(e-d)}{(e-f)}(h-g)$

❺ $\sqrt[n]{a}+\sqrt[n]{b^n}+\sqrt[n]{e}=\sqrt[n]{a+b^m+e}$

❻ 兩三角形全等不一定相似。

❼ 一直線的垂直平分線上任意點距離此直線的兩端等遠。

❽ 等差級數各項的倒數成爲調和級數。

❾ 一圓的外切正多邊形的周界大於兩倍邊數的外切正多邊形的周界。

❿ 月截取同弧而在這弧所對弦的異側的二圓周角必相補。

**II 填充題**：每題二分

❶ 有一件工程，做了一半的七成半還有_____%沒有做。

❷ 本金 100 元，年利二分，若存_____年，利息就和本金相等。

❸ 三角形的垂心到各角頂的距離，等於從三角形的外心，到各對邊距離___倍。

❹ 等腰直角三角形三邊的比_____。

❺ 13和21的等差中項_____。

❻ 設有 $x=2$，$y=1$ $(10x+2y)^0+(5y-3)^0$ 等於_____。

❼ 分解因式：$1-3(x-y)+3(x-y)^2-(x-y)^3=$_____。

❽ 等周三角形中以＿＿＿＿三角形的面積最大。

❾ $a+bi$ 與＿＿＿＿叫做共軛複數。

❿ $n$邊多角形由一頂點共可分爲＿＿＿＿個三角形。

**Ⅱ 選擇題**：（祇認爲對的號碼填在題後括弧內，每題一分，錯了倒扣一半，塗改作廢）。

❶ $a$ $b$ 兩數的等比中項爲 ① $\pm\sqrt{ab}$ ② $\frac{a-b}{2}$ ③ $\frac{2ab}{a+b}$ ……（ ）

❷ $log\,120$ 等於 ① $log12\times log10$ ② $log12+log10$ ③ $log12\div log10$ …（ ）

❸ 已知三角形 $A\ B\ C$ 中 $C$ 角等於 120°，則其對邊 $c$ 邊 ① $c^2<a^2+b^2$ ② $c^2=a^2+b^2$ ③ $c^2>a^2+b^2$ ……（ ）

❹ $a\sqrt{x^2+1}+b\sqrt{x+1}+c=0$ 是 ①無理方程式 ②有理方程式 ③二次方程式……（ ）

❺ 與二同心圓等距離之點之軌跡是 ①一點 ②一圓 ③一直線……（ ）

❻ 圓的面積等於 ① $\frac{1}{2}\pi d^2$ ② $\frac{1}{4}\pi d^2$ ③ $\frac{1}{4}\pi r^2$ $\left(\begin{matrix}d=直徑\\r=半徑\end{matrix}\right)$ ……（ ）

❼ $0\div\frac{3}{10}$ 等於 ① $\frac{3}{10}$ ② $\frac{10}{3}$ ③ 0……（ ）

❽ 一圓地的周圍100公尺，每隔10公尺種樹一株，應該種樹 ① 9株 ② 10株 ③ 11株 ……（ ）

❾ 直角三角形的斜邊上頂垂線爲分斜邊所得二線段的 ① 比例第三項 ② 比例第4項 ③ 比例中項 ……（ ）

❿ 不等邊三角形中一角爲 60° 時比角所對的邊 ① 最大 ② 最小 ③ 非最大亦非最小……（ ）

**Ⅳ 分解因式**：八分

❶ $2a+(a^2-4)x-2ax^2$

❷ $x^4+\frac{1}{64}$

**Ⅴ**（八分）

直角三角形斜邊長爲2尺，面積爲96方寸，求其他兩邊長？

**Ⅵ**（八分）

桃子一百個分給兒童，第一個人得10個，以後依次多得5個，求兒童幾人？

**Ⅶ**（十分）

求作一正方形與一已知三角形等積。

**Ⅷ**（八分）

梯形$ABCD$的對角線共中點聯線$EF$等於平行二邊 $AD$, $BC$ 的差的一半。試證之。

**Ⅸ**（十分）

$P$爲三角形$ABC$的垂心，$AP$與$BC$和外接圓的交點順次爲 $E$,$F$, 試證$PE=EF$

（八分）

**Ⅹ** 某校入學考試中，及格者較投考者八分之一多25人，不及格者較投考者五分之四多35人求投考生多少？

# 臺北市私立靜修女子中學

**一、算術部份**（勿用代數解答，否則不予計分）每題10%

❶ 化簡 $\dfrac{1-\dfrac{1}{2}}{1-\dfrac{1}{1+\dfrac{1}{2}}}$

❷ 每小時，甲記帳可記7册，乙可記5册，但在一日中乙雖較甲多工作1小時，然仍少記13册，問兩人在一日內工作時間各多少？

**二、代數部份**（每題10%）

❶ $0.5x+0.6x-0.8=0.75x+0.25$

❷ 設 $a=9, b=12, c=15, 2S=a+b+c$ 時，則 $\sqrt{S(S-a)(S-b)(S-c)}$ 之值如何

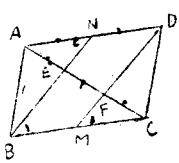
❸ $\dfrac{3\sqrt{2}+2\sqrt{5}i}{3\sqrt{2}-2\sqrt{5}i}$

❹ 等差級數之第二項與第三項之和爲19，而第五項與第七項之和爲40，求其首項

❺ 一汽車上山，每小時行15公里；下山每小時行30公里，10小時共行210公里，問上下山各需多少小時？

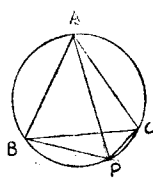
**三、幾何部份**（每題10%）

❶



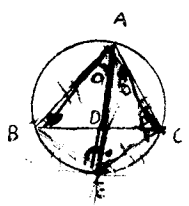

平行四邊形對邊 $AD$, $BC$ 的中點順次爲 $N$, $M$ 聯結 $BN$, $DM$, $AC$, 則 $AC$ 被 $BN$, $MD$ 分爲三等分。

❷




$\triangle ABC$ 爲圓的內接正三角形， $P$ 爲弧 $BC$ 上的任意點，試證 $PA=PB+PC$

❸




$\triangle ABC$ 的頂角 $A$ 的平分線遇底邊於 $D$, 遇外接圓周於 $E$,
證 $AB\cdot AC=AD\cdot AE$

## 臺北市私立開南商工職業學校

一 二數乘積爲1944，最大公約數爲18，求此二數（20分）

二 因數分解（20分）

❶ $25a^2-(2a-3b)^2$ ❷ $a^2+b^2+c^2+2ab+2bc+2ca$

❸ 設 $mx^2-2x+3$ 可爲 $x-3$ 除盡，則$m$之值若干？（20分）

四 四邊形相隣各邊中點的連線成一平行四邊形，試證之（20分）

五 連結三角形各邊中點的直線，分原形成四個全等三角形（20分）

## 省立基隆中學

**Ⅰ、填充：**（每題2分）

❶ 如 $a:b=c:d$ 則 $a+b:a-b=$_____：_____。

❷ $\sqrt{-4}\times\sqrt{-9}=$_____。

❸ $\sqrt{27a^3b^2c}=$_____ $\sqrt[3]{16x^5y^3}=$_____。

❹ $2a+x,\ 3a,\ 4a-x,\cdots\cdots$爲_____級數。

❺ 有方程式$3x^2-x-1=0$，則其二根之和爲_____，二根之積爲_____。

❻ 三角形之外心爲_____交點，此點與_____等距離。

❼ 三角形_____內分_____之兩線段，與其餘二邊成比例。

❽ 三角形任何二邊之差_____第三邊。

❾ 於 $\triangle ABC$ 內 $\angle A<\angle B<\angle C$ 則最大邊爲_____。

❿ 如有下列任一條，則四邊形可證其爲平行四邊形。

① 兩對對邊平行_____ ② 兩對對邊_____

③ 兩對對角_____ ④ 一對對邊_____

⑤ 對角線_____

**Ⅱ、選擇：**下列各題所附之括弧中，寫出你認爲是對的號碼。（每題2分）

❶ 若用圖表示聯立方程式 $y=2x+3$，$2y-4x+6=0$ 則爲

① 相交二直線 ② 二直線重合 ③ 平行二直線……（ ）

❷ $x^3+y^3$ 與 $(x+y)^2$ 之 $H.C.F.$（或謂 $G.C.F.$）爲

① $x+y$ ② $x^2-xy+y^2$ ③ $x^2+y^2$……（ ）

❸ 平行公理：①二直線無論如何延長永不相交

②過一已知直線外一點只能作一直線與其平行

③與二平行線之一相交之直線必交於另一直線……（ ）

❹ 圓內接四邊形之對角互爲 ①隣角 ②餘角 ③補角……（ ）

❺ 過圓之半徑外端，與此半徑垂直之直線爲 ①截線 ②切線 ③割線

……（ ）

❻ $n$ 邊形內角和爲 ① $4rt\angle$ ② $2(n-2)\ rt\angle$ ③ $\frac{2(n-2)}{n}rt\angle$

……（ ）

❼ $i^{25}$ 等於 ① $-i$ ② $i$ ③ $-1$ ……（ ）

❽ 若 $a$ 不等於零，則 $a^0$ 等於 ① 0 ② 1 ③ $a$ ……（ ）

❹ 三角形內角和等於 ① 180度 ② 360度 ③ 90度 ……（ ）

❺ 循環小數爲 ①無理數 ②虛數 ③有理數……（ ）

Ⅲ、**因式分解**：（即析因式）（每題5分）

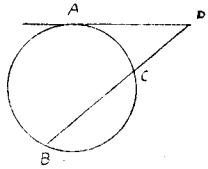
❶ $a^2+b^2+c^2-2ab+2ac-2bc=$

❷ $x^4+x^2y^2+y^4=$

Ⅳ、解一元二次方程式：$ax^2+bx+c=0$（10分）

Ⅴ、自 $P$ 作切線 $PA$，割線 $PBC$ （10分）

求證 $\overline{PA}^2=PB\cdot PC$

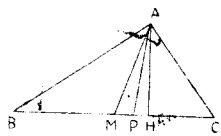



Ⅵ、於 $rt\ \triangle ABC$，$\angle A=rt\angle$

中線 $AM$ 垂線 $AH$，

$\angle A$ 之內分角線 $AP$，

求證 $\angle MAP=\angle HAP$ （10分）




Ⅶ、有一工程，甲要8日，乙要12日才可以完成，甲乙二人合作4日後，乙一人獨做還需要幾日？（算術10分）

Ⅷ、雞蛋一籃，第一次賣去全數之$\frac{1}{2}$少一個，第二次賣去所餘之$\frac{1}{2}$少一個，第三次賣去所餘之$\frac{1}{2}$少一個，尚餘24個，問原有幾個？（算術10分）

## 省立基隆女子中學

**算 術**

Ⅰ 是非題：（每題一分，對的用『＋』號，錯的用『－』號，錯了倒扣。）

❶ $2\frac{0}{2}=0$……（ ）

❷ 圓周之長爲（半徑＋半徑）×周圍率……（ ）

❸ 梯形的面積＝$\frac{\text{上底}+\text{下底}\times\text{高}}{2}$……（ ）

❹ 一公斤四公兩就是 $1\frac{4}{16}$公斤＝ $1-\frac{1}{4}$公斤……（ ）

❺ 分數的分母是被除數，分子是除數。……（ ）

Ⅱ 選擇題：（每題一分，把答案對的前面數字寫在括弧內，錯題倒扣）

❶ 帶分數的值：①比1大；②比1小；③相等……（ ）

❷ 一萬是10的：①100倍；②1000倍；③10000倍……（ ）

❸ 一數除零等於：①本數；②任何數；③零……（ ）

❹ 年利一分就是：①$\frac{10}{100}$；②$\frac{1}{100}$；③$\frac{0.1}{100}$……（ ）

❺ 小數乘小數其值：①越乘越小；②越乘越大；③不變……（ ）

Ⅲ 填充法：（每題二分）

❶ 我國與英國所訂南京條約中的賠款 21,000,000兩，就是(＿＿＿)萬兩。

❷ 把$33\frac{1}{3}$%化爲分數是（＿＿＿＿）。

Ⅳ 應用題：（每題六分）

❶ 兩點鐘到三點鐘中間，問時針和分針兩針相重是在甚麼時候？

❷ 本金5000元，月利五分，問三個月的利息是多少？

**代 數**

❶ 分析下列各式的因式：（10分）

① $(x^2+4x)^2-2(x^2+4x)-15$

② $x^4-3^2+1$

❷ 解下列各無理方程式：（8分）

① $\sqrt{x+20}+\sqrt{x+4}=2\sqrt{x+11}$

② $\sqrt{x+7}-\sqrt{5(x-2)}=3$

❸ 求作以$-6,-\frac{1}{3}$爲根的一元二次方程式：（4分）

❹ 求 $64x^6+192x^5+240x^4+160x^3+60x^2+12x+1$ 的六次方根。（8分）

❺ 解 $\left.\begin{aligned}x^2-4y^2&=9\\xy+2y^2&=3\end{aligned}\right\}$（8分）

❻ 有兩個兩位數，其一數適由他一數兩數字倒置而成，若這兩數的和爲99，其差爲45，求各數字。（6分）

**幾 何**

證明題：（每題六分）

❶ 連結梯形對角線中點之線，等於兩底差之一半，試證明之。

❷ 三圓外切，其內外二根公切線，已知其有一內公切點與二外公切點，證明此三切點爲直角三角形之三頂點。

❸ 三角形二邊之積等於第三邊上之高，乘以其外接圓之直徑，試證之。

作圖題：

❹ 作二已知線間之比例中項，並證明之。

計算題：

❺ 於半徑爲10尺之圓內，求60°弓形之面積。

## 省立基隆水產職業學校

一 **是非法**：（對的在括號內劃「＋」，錯的劃「－」）

❶ 將一個比的前項與後項位置交換所得的比叫做原來比的「連比」……（ ）

❷ 一個完全平方數如果小數部份有六位，則平方根小數有二位。……（ ）

❸ $x^0=0$

❶ 等式中的文字無論代表甚麼數，左右兩邊都相等的叫做恒等式。……( )
❺ $a^3+b^3=(a+a)(a^2+ab+b^2)$ ……( )
❻ 三角形之邊高的交點叫做三角形的內心。……( )
❼ $n$ 邊正多角形的每一角等於$\frac{2(n-2)}{n}$直角……( )
❽ 引用兩角及夾邊相等則兩三角形全等的定理時可簡寫爲 "sas" ……( )

二 填充法
❶ $(x+y)^3=x^{(\ )}+(\ )x^2y+(\ )+xy^{(\ )}+y^{(\ )}$
❷ 分式兩項間沒有公因式的叫做（ ）或（ ）。
❸ 幾個比的前項積做前項後項積做後項所成的比叫做這些比的（ ）。
❹ 在一圓內有許多平行的弦，這些弦中點的軌跡是此圓的（ ）。
❺ 引用「三邊均等兩三角形全等」一定理時可簡寫作（ ）。
❻ 三角形的內心是（ ）。
❼ 一個分數的立方根是，把原分數的（ ）作分子，原分數（ ）作分母的分數。
❽ 按照一定的連比把某量（或數）分成若干份叫做（ ）比例。

三 選擇法：在是的下面劃「————」
❶ 每個三角形的傍心有一個，二個，三個，$n$個。
❷ 將定理的終結做假設，假設做終結成一定理就叫做系定理逆定理。
❸ 所謂虛數是：$-1$，$\sqrt{7}$，$-\sqrt{-1}$，$\sqrt{-1}$。
❹ 在 $ax^2+bx+c$ 這一三項式中，如 $b^2-4ac$ 等於 (a) 完全平方數 (b)負數 (c)不完全平方式 (d)零則此式爲完全平方式。

四 問答
❶ 解下列聯立方程式
$$\begin{cases}5x-2y=5\\3x+7y=85\end{cases}$$
❷ 求 $x^4+4x^3+10x^2+12x+9$ 的平方根？
❸ 試證三角形三內角之和爲兩直角？
❹ 試證圓周角爲所截之弧一半所度？
❺ 試證直角三角形斜邊上的平方必等於其餘兩邊上的平方和？

## 省立宜蘭中學

一、化簡下列各式：（每題4分）
❶ $\frac{x^4+x^2+1}{x^2-x+1}$　　❷ $\frac{x^3-1}{x-1}$

二、某人的年齡是子年的三倍，四年前他們的年齡的和是60歲，子年現在年齡多少？（9分）

三、解下列聯立方程：（9分）
$$\begin{cases}x^2-y^2=8\\x^2-4xy+3y^2=0\end{cases}$$

四、試因式分解下各式：（每題4分）

❶ $x^2-x+\frac{1}{4}$

❷ $x^3+8$

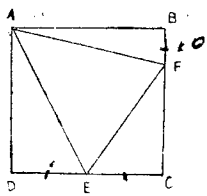
❸ $6x^2-7x-20$

五、求下列二式結果：（每題3分）

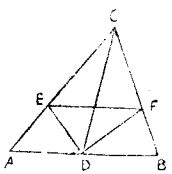
❶ $3\sqrt{a}\ (\sqrt{a}+\sqrt{b})$ （但 $a>o$, $b>o$）

❷ $\sqrt{-8}+\sqrt{-18}-\sqrt{-50}$

六、分360成三份使成3：5：7的連比。（6分）

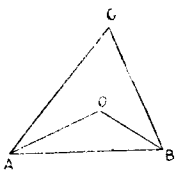
七、 

$AECD$ 爲正方形，$AB=40$公寸，$DE=EC$, $BF=10$公寸，求 $\triangle AEF$ 的面積。（8分）

八、 

設：$CD$ 爲 $\triangle ABC$ 中線，$DE$ 平分 $\angle CDA$, $DF$平分 $\angle CDB$, 求證： $EF/\!/AB$（8分）

九、兩圓交於 $A$ 及 $B$, $O$ 及 $O'$ 爲兩圓圓心，求證： $OO'$ 上平分 $AB$（8分）

十、 

設：$AO$ 平分 $\angle A$, $BO$平分 $\angle B$.（8分）

求證： $\angle AOB=90^\circ+\frac{\angle C}{2}$

十一、試證三角形三中線之和，大於其半周。（9分）

十二、已知三角形的一底角，底邊及底上之高，求作此三角形。（9分）

## 省立蘭陽女子中學

一、下列各題：若是對的在（　）內填入正號，若是不對的，在（　）內填入負號。（20%）

❶ $(-3)^3=27$ ……（　）

❷ $5a^2=25a^2$ ……（　）

❸ $0.\dot{3}=\frac{1}{3}$ ……（ ）

❹ $a^3\cdot a^2=a^6$ ……（ ）

❺ $4a-7a=-3a$ ……（ ）

❻ $\frac{1}{5}>0.25$ ……（ ）

❼ $(-7)\times(-5)=-35$ ……（ ）

❽ $i^6=i^4\cdot i^2=(1)\times(-1)=-1$ ……（ ）

❾ $\sqrt{2}-\sqrt{3}$ 的有理化因式是 $\sqrt{2}+\sqrt{3}$ ……（ ）

❿ $\frac{\frac{1}{2}}{\frac{3}{4}}=\frac{1}{2}\div\frac{3}{4}$ ……（ ）

二、下列各題中，請在空白部分（橫線上），填入適當的文句或數字：（9%）

❶ 三角形有兩邊相等的，就叫做＿＿＿三角形。

❷ 圓的兩弦在圓周上，相交成角，就叫做＿＿＿角。

❸ 凡圖形可使完全重合（重疊而相合）除位置以外，其形狀大小無不相等的，叫做＿＿＿。

❹ 相似多邊形面積的比，等於＿＿＿。

❺ 正五邊形的一內角，等於＿＿＿度。

❻ 在 $\triangle ABC$ 內，銳角 $A$ 的對邊是 $a$，$\Upsilon$ 是 $b$ 邊在 $C$ 邊上的正射影，則 $a^2=$＿＿＿。

三、同圓或等圓內，如兩圓心角相等，則他們所對的弦也相等，試證之。（7%）

四、（作圖題）分已知線段成二份，使其比等於其他二已知線段的比。（7%）

五、求下列各組數的最大公約數：（50%）

❶ 24, 20, 16　　❷ 5688, 4977

六、計算下列各題：

❶ $\frac{1}{6}+\frac{3}{4}+\frac{1}{8}=?$　　❷ $b^3x^3y^2\div b^3y^2=?$

❸ $\frac{a}{m+n}\times\frac{m^2-n^2}{ay}=?$　　❹ $(\sqrt{3}+\sqrt{2})^2=?$

七、解下列各方程式：

❶ $x^2-3x-10=0$　　❷ $\begin{cases}x+y=5\\xy=6\end{cases}$

❸ $\sqrt{x+5}+3=6$　　❹ $\frac{\sqrt{x+9}}{\sqrt{x+2}}=\frac{4}{3}$

八、某小孩3年後的年齡，恰是3年前的平方數，求他現在的年齡。（7%）

## 省立宜蘭農業職業學校

一 **代數**（50分）

❶ 解下方程式：　　❷ 化簡

$$\begin{cases} y+z=14 \\ z+x=18 \\ x+y=24 \end{cases}$$

$$\frac{x-1-\dfrac{2}{x}}{1-\dfrac{1}{x}-\dfrac{2}{x^2}}$$

❸ 求 $(a^3+b^3+c^3-3abc)\div(a+b+c)$ 的商。

❹ 甲乙二數的和是100，甲數的2倍加10等於乙數，求甲乙二數。

❺ 某工程 $AB$ 二人合作，$6\frac{2}{3}$ 日可成，若由一人獨作則 $B$ 比 $A$ 多3日作成，求各人獨作所需時日。

## 二 幾何（30分）

❶ 一多邊形有 135 個對角線，問此多邊形有幾邊？

❷ 由等腰三角形等腰之中點與所對頂角之頂點聯成之二直線必相等，試證之。

❸ 聯四邊形各邊中點的四邊形爲平行四邊形。

## 三 算術（20分）

❶ 本金10000元，年利 8 %，依複利計算，3年後本利和多少元？又複利息多少元？（每年計算利息一次）

❷ $0.\dot{4}5\div0.\dot{2}\dot{7}\times3.\dot{2}\dot{7}=$ ？

# 省立桃園中學

## 一 填充題

❶ 矩形與菱形相同點是＿＿＿＿，不同點是＿＿＿＿。

❷ 欲證明兩條直線互相平行的證法是證＿＿＿＿，或證＿＿＿＿

❸ 求 $n$ 邊正多角形每一內角的公式是＿＿＿＿，求每一外角的公式是＿＿＿＿。

❹ 欲證明四點在同一圓周上的證法是＿＿＿＿。

❺ 相似形的條件是 ①＿＿＿＿ ②＿＿＿＿。

❻ 把一個任意五邊形變成等積三角形的步驟是 ①＿＿＿＿ ②＿＿＿＿。

❼ 一元二次方程式 $6x^2-7x-8=0$ 判別式的值是＿＿，故二根是＿＿數。

❽ 求等差級數末項的公式是 $l=$＿＿＿＿，求總和的公式是 $S=$＿＿＿＿。

❾ 時鐘問題中長針與短針速度的比是＿＿＿＿。

❿ 寒暑表問題中由華氏表化成攝氏表度數的公式是＿＿＿＿

## 二 解方程式

❶ 解：$\begin{cases} \dfrac{5}{x}-\dfrac{3}{y}-\dfrac{1}{2}=0 \\ \dfrac{6}{y}-\dfrac{1}{x}-\dfrac{4}{5}=0 \end{cases}$

❷ 解：$\begin{cases} x^2+y^2-181=0 \\ x-y-1=0 \end{cases}$

## 三 分解因式：

❶ $16x^4-y^4=$

❷ $3x^2-21x+36=$

❸ $x^3-y^6=$

❹ $x^3y-8x^2y-20xy=$

❺ $10x^3-10y^3-30x^2y+30xy^2=$

**四 計算下列各題：**

❶ $\dfrac{\sqrt{2\times y\times 3\sqrt{4x^2y^2}}}{\sqrt[4]{8x^3y^3}}$

❷ $\dfrac{1+\sqrt{-1}}{1-\sqrt{-1}}=$

❸ 等腰直角三角形的斜邊長$30\sqrt{2}$公分，求面積。

❹ 梯形的上底長12公分，高與下底均爲上底之二倍，求面積。

❺ 兩圓半徑的比爲2：1，求面積的比：

**五 證明題**

❶ 試證等腰梯形的兩條對角線必相等。

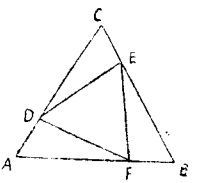
❷ 試證同圓外切正三角形的周界等於其內接正三角形周界的二倍。

## 省立桃園農業職業學校

❶ 一個圓池的周圍有120公丈，甲、乙、丙三人同時同地同向沿着周圍競走，每分鐘甲走6公丈，乙走8公丈，丙走10公丈，問何時三人再在原地相會。（10分）

❷ 有每袋盛50公斤之米24袋，每袋價100元，今想改裝每袋盛60公斤，可裝幾袋？每袋若干元？（10分）

❸ 右圖 $\triangle ABC$ 爲正三角形。（20分）
且 $AF=BE=CD$
求證 $\angle D=\angle E=\angle F$




❹ 試證一圓之內接四邊形對角之和爲一平角。（20分）

❺ 解 $x^2+\dfrac{9}{x^2}=10$ （20分）

❻ 演算 $(x^3+y^3)\div(x+y)$ （20分）

## 省立新竹師範學校

**甲、算術**：30%（每題6分）

❶ $(0.16+0.\dot{1}\dot{6}\times 3)\times\left\{100-5\div\left[\dfrac{7.7}{100}+0.125\times\dfrac{2}{5}-(0.3)^3\right]\right\}=$

❷ 某校招考新生，正取生佔報考人數32%，備取生佔報考人數13%，未能錄取者還有825人，問報考學生共有多少人？

❸ 某校分配學生宿舍，如每間住18人，則剩餘房屋一間；如每間住14人，則有18人無屋可住，問該校住宿生有多少人，宿舍有幾間？

❹ 李君有住房一所，向保險公司保了火險，屋價原值爲63,000元，但只按原值$\frac{5}{7}$一報保，保險率每年是8%，12年後此屋遭了火災，問保險公司及李君各損失多少？

❺ 臺北位於東經 121°31′，南京位於東經 118°53′，如果南京是上午九時，則臺北是什麼時刻？

**乙、代數**：（40%）

❶ 化簡下列各式：（每小題5分）

(A) $(a-\frac{b}{2}-\frac{c}{3})(a-\frac{b}{2}+\frac{c}{3})+(\frac{b}{2}+\frac{c}{3})^2$

(B) $\frac{x^2+7x+12}{x^2+3x-4}\times\frac{x^2-5x+6}{x^2-8x+15}\div\frac{x^2+x-6}{x^2-4x-5}$

❷ 分解下列各式之因子：（每小題7分）

(A) $x^2+2xy+zy+y(y+2z)$

(B) $12a^2+2b^2+6c^2-11ab+22ac-13bc$

❸ 解下列聯立方程式：（每小題8分）

(A) $\begin{cases}x+y=5\\x^2+y^2-xy=7\end{cases}$

(B) $\begin{cases}x+y+z=18\\\frac{x+y}{5}=\frac{y+z}{7}=\frac{z+x}{6}\end{cases}$

**丙、幾何**：（30%）

❶ 三角形一角之平分線，遇外接圓於一點，此點與三角形其餘二頂點，及內切圓圓心等距離，試證明之。（8%）

❷ 設二圓中心之距離是16，而半徑是5及3，求內公切線之長。（7%）

❸ 設直角三角形 $ABC$ 的面積爲600方呎，斜邊 $BC$ 長爲50呎，$AB>AC$，求兩邊 $AB$，$AC$之長。（8%）

❹ 試證聯結三角形各邊中點的直線，必分原形爲四個全等三角形。（7%）

## 省立新竹中學

**甲 是非題**（20%）

下列各題，若認爲適當，於括號內填寫「+」號，不適當，填寫「=」號，不知道的便不填寫。

❶ 解 $ax+b>0$ 若 $a<0$，則 $ax>-b$，$x>\frac{-b}{a}$……（ ）

❷ 若 $x<0$，又 $x>100$，故 $x$ 值可寫爲 $0>x>100$。……（ ）

❸ 含 $x$ 之一般二次方程式，常設爲 $Ax^2+Bx+C$，式中 $A\neq0$。……（ ）

❹ 任兩圓均可作兩內公切線，兩外公切線。……（ ）

❺ 四邊形若四邊相等，兩對角線垂直且等分，則均爲正方形。……（ ）

❻ 在同圓或等圓內，弦不等，距圓心亦不等，弦長者距圓心遠，弦短者距圓心近。……( )

❼ 圓周角等於弦切角，且等於其所對圓心角之一半。……( )

❽ 任兩三角形，若有兩角及任一邊對應相等，則爲兩全等三角形。……( )

❾ $n$個$a$之連乘積可寫爲$a^n$，又$n$個$a$與$m$個$a$之連乘積可寫爲$a^{m+n}$。 …( )

❿ 比，除式，與分式，具有相同之意義即，前項：後項＝被除數÷除數$=\frac{\text{分子}}{\text{分母}}$。……( )

## 乙 選擇題（20%）

下列各題中，對的答案，選擇出來，再將號次填入括號內：

❶ 設有$\sqrt{5}x^2+\frac{2}{3}x+\sqrt{7}$。此式爲①有理整式 ②有理分式③無理整式 ④無理分式。……( )

❷ 設有 $a+b-c=(a-c)+b=a+(b-c)=\cdots\cdots$；則此爲 ①交換律 ②結合律 ③分配律④符號律……( )

❸ 解方程式時，所用之移項法則，係根據 ①運算律 ② 指數律 ③ 等量公理 ④幾何公理。……( )

❹ 解 $ax+by=c$，其 ①無一組解 ②有一組解 ③有若干組解 ④有無限多組解。……( )

❺ 兩相似多角形，必 ①邊角均相等 ②邊角均成比 ③邊相等角成比 ④邊成比角相等。……( )

❻ 兩隣角和若等於 360° ，則此兩角稱爲 ①餘角 ②補角 ③共軛角 ④圓周角。……( )

❼ 任意三角形內角和，等於 ①90° ②180° ③ 270° ④ 360°……( )

❽ 任意三解形三中線之交點稱爲 ①重心 ②垂心 ③內心 ④外心……( )

❾ 解 $ax^2+bx+c=0$，若 $b^2-4ac>0$，且爲完全平方，則其兩根爲 ①有理數 ②無理數 ③相等實數 ④共軛複數……( )

❿ 若三角形一邊之平方等於他兩邊之平方和，則此三角形爲 ① 直角三角形 ②銳角三角形 ③鈍角三角形 ④任意三角形。……( )

## 丙 運算題（60%）

❶ 求值

(i) $-\{-[-(-5)]\}-[-(-4)]=$

(ii) $3-\cfrac{11}{2+\cfrac{2}{3-\cfrac{1}{3}}}=$

❷ 解方程式

(i) $6x^2+7x+2=0$

(ii) $\sqrt{x+1}=x-5$

❸ 解聯立方程式

(i) $\begin{cases} x+y=3 \\ x^3+y^3=9 \end{cases}$ (ii) $\begin{cases} \frac{1}{x}+\frac{1}{y}=3 \\ \frac{1}{y}+\frac{1}{z}=5 \\ \frac{1}{z}+\frac{1}{x}=4 \end{cases}$

❹ 若 $mx^2+2x+1=0$ 之兩根爲 ①不等實數 ②相等實數 ③共軛複數 試分別求$m$之值。

❺ 有一眞分數，其分母比分子大5，若分子分母同減去3則得$\frac{5}{7}$，求此分數。

❻ 某校數數競試，成績最優得甲等獎者，佔19%，次優得乙等獎者，佔25%，未得獎者尚有560人問全校學生人數多少？

❼ 兩圓相交，其連心線必爲公弦之中垂線，試證明之。

❽ 已知兩邊及第三邊上中線之長，求作此三角形。

❾ 求作一矩形，使其與已知正方形等積，且其長寬之差等於定長。

❿ 解 $\begin{cases} ax+by=c \\ a'x+b'y=c' \end{cases}$ 並討論有無解答之情形。

## 省立新竹女子中學

❶ 甲乙二船，劃速相等，甲從上埠到下埠，乙從下埠至上埠，同時相向而行，經4小時相會，若是上下埠的距離爲24里，每小時水速爲1里，問相會後甲到下埠，乙到上埠分別還要多少時間？（算術）（10%）

❷ 分解因式：

$x^4-2(a^2+b^2)x^2+(a^2-b^2)^2$ （10%）

❸ 化簡下式：

$$\frac{5-6\sqrt{-1}}{7-14\sqrt{-1}}$$ （10%）

❹ 解 $\begin{cases} x^2+3y^2=31 \\ 7x^2-2y^2=10 \end{cases}$ （10%）

❺ 解 $\frac{x-4}{x-5}-\frac{x-5}{x-6}=\frac{x-7}{x-8}-\frac{x-8}{x-9}$ （10%）

❻ 設方程式 $x^2+px+q=0$ 之一根爲他根之2倍，則 $9q=2p^2$，試證之。（10%）

❼ 試證平行四邊形兩對角線平方的和，等於其四邊平方的和。（10%）

❽ 試證直角三角形斜邊上的正方形，等於兩直角邊上正方形的和。（10%）

❾ 如果有三個三角形，第一個三角形與第二個三角形相似，第二個三角形與第三個三角形相似，問第一個三角形與第三個三角形一定，不一定相似？又其理由何在？（10%）

❿ 求作一矩形，與已知正方形等積，而底與高的差等於已知線段。（10%）

# 省立新竹工業職業學校

一、下列各題，對的記(＋)；不對記(－)，填在其後的括號內（20%）

❶ $-\{-[-(x-y)]\}=x+y$ ……（ ）

❷ $n$ 爲整數時 $2n\pm1$ 可代表一切奇數。……（ ）

❸ 若 $a$ 爲有理數，則不論 $n$ 爲什麼正整數，$\sqrt[n]{-a^2}$ 恆爲虛數。……（ ）

❹ $\dfrac{1}{8^{-\frac{1}{3}}}=2$ ……（ ）

❺ $\sqrt{-4}\cdot\sqrt{-4}=\sqrt{(-4)(-4)}=\sqrt{16}=4$ ……（ ）

❻ 一元二次方程式有等根之必要條件爲 $b^2-4ac>0$……（ ）

❼ $a$, $b$ 二數之調和中項爲 $\dfrac{a+b}{2ab}$……（ ）

❽ 過弦一端作圓的切線則此切線與弦所夾的角，等於此弦所對的圓心角。……（ ）

❾ 過任意三點不能作一圓。……（ ）

❿ 有二角彼此相等的兩三角形必定相似。……（ ）

二、將正確的答案，填入下列各題的橫線上（30%）

❶ $\sqrt[4]{1}$ 有_____ _____ _____ _____四根

❷ $x^4-5x^2+4=(x+1)(x+2)(x-\_\_\_)(x-\_\_\_)$

❸ $x^2-y^2+2yz-z^2=(\_\_\_\_\_)\ (\_\_\_\_\_)$

❹ $\sqrt{6+2\sqrt{5}}=$_____或_____

❺ 已知 $x=3y^2$ 則二變數之三對應值如右：

| | | | |
|---|---|---|---|
| $x=$ | 3 | | $\frac{1}{3}$ |
| $y=$ | | $\frac{1}{2}$ | |

❻ $\dfrac{x-1}{x+3}-\dfrac{x-3}{x-2}=\dfrac{}{x^2+x-6}$

❼ 畢氏 (*Pythagoras*) 定理僅適用於_____三角形。

❽ 大小二圓內切，則二圓心之距離＝_____。

❾ 二圓外切時可作_____條公切線。

❿ 正十二邊形一內角＝_____度。

三、解答下列各題（可不抄題，但次序不得顛倒）（50%）

❶ 分解 $6x^4-13x^3-5x^2+17x-6$ 爲質因式之積。

❷ 解 $\begin{cases}\dfrac{1}{x}-\dfrac{1}{z}=1\\ \dfrac{2}{y}+\dfrac{1}{z}=5\\ \dfrac{3}{x}+\dfrac{4}{y}=2\end{cases}$

❸ 若 $\alpha, \beta$ 爲 $x^2+px+q=0$ 之二根，則二根爲 $\frac{1}{\alpha^2}$ 及 $\frac{1}{\beta^2}$ 之方程式如何？

❹ 兩數之和爲28，平方和爲394，求此二數。

❺ 一球落地時反躍之高度爲原高之 $\frac{3}{5}$，今若此球自距地100公尺處落下，其下落及反躍之路徑恆與地面垂直，問此球自開始下落至靜止於地面，共歷路程若干？

## 省立新竹商業職業學校

❶ 某中學招考新生，高初中報名共有2000人，高中每人收報名費10元，初中每人收8元，共收17372元，問高初中報名投考人數各多少？（15%）

❷ 有許多蘋果和橘子，蘋果是橘子的2倍，現在每次拿出橘子3個，蘋果4個，拿出幾次後，橘子恰好沒有，而蘋果還餘16個，問蘋果和橘子各有幾個？（15%）

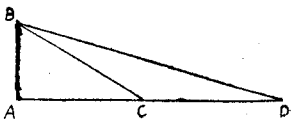
❸ 大和尚每人吃4個饅頭，小和尚4人合吃一個饅頭，現在100個和尚吃了100個饅頭，那麼大小和尚各有多少人？（15%）

❹ 求解方程式 $\frac{(y+1)(y+9)}{y-1}=4y-3$ （10%）

❺ 解聯立方程式 $\left.\begin{matrix} x-y=4 \\ x^2+y^2=40 \end{matrix}\right\}$ （15%）

❻ 兩圓的兩外公切線和一內公切線相交，則兩交點間的線段，等於外公切線。（15%）

❼ 如右圖：某甲要測量塔 $AB$ 的高，在平直的路 $DCA$ 上向塔走，在 $D$ 處測得 $\angle BDA=15°$，在 $C$ 處測得 $\angle BCA=30°$ 若 $DC=300$尺，求 $AB$ 的高。（15%）




## 省立苗栗中學

**(一)算術**：（每題6分）

❶ $48-16+7\times4-18\div3\times9+4=$

❷ 某人交儲人國幣25000元，叫他買酒5斤，醬油3斤，後來儲人買錯爲醬油5斤，酒3斤，餘國幣2000元，問酒和醬油每斤價若干？

❸ 本金4000元，年利率6%，依一年一期的複利計算利息，求三年後的本利和。

**(二)代數**：（1.2兩題每題6分，其餘各題每題7分）

❶ 試展開下列各式。

(a) $(a+b+c)^3$

(b) $(a+b)^n$ ($n$ 爲正整數)

❷ 解下列聯立方程式

$$\begin{cases} 5x-6y+3z=2\cdots\cdots\cdots\cdots① \\ 3x+5y-2z=7\cdots\cdots\cdots\cdots② \\ 2x+3y+z=11\cdots\cdots\cdots\cdots③ \end{cases}$$

❸ 析 $x^3+2x^2+2x+1$ 之因式。

❹ 有連續整數三個，其平方和爲245，求此三數。

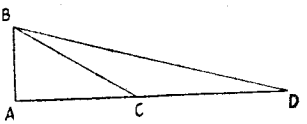
❺ 有一工程，甲乙兩人合作則12日可成，可是甲獨做比乙獨做少10日可成，問甲、乙獨做幾日可成？

❻ 一船在一長20里的河道中往來，一次共費10時；此船 流走四里的時間，逆流祇能走三里。求一往一來各走幾時？

❼ $a$、$b$、$c$ 的倒數是等差級數時，試證明： $a:c=a-b:b-c$

**(三)幾何**：（每題 7 分）

❶ 如圖，某甲要測量塔 $AB$ 的高，在平直的路 $DCA$ 上向塔走，在 $D$ 處測得 $\angle BDA=15°$，在 $C$ 處測得 $\angle BCA=30°$，若 $DC=300$公尺，求 $AB$ 的高。




❷ 正十二邊形的每一內角及外角是幾度？

❸ 三角形兩邊中點的連結線，必平行於第三邊，且等於其半。

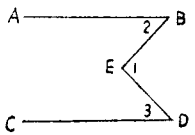
❹ 在 $\triangle ABC$ 的各邊上，向外各作正三角形 $ABF$，$ACE$，$BCD$，求證 $AD=BE=CF$。

❺ 已知等腰三角形的頂角及高，求作這三角形。

## 省立苗栗農業職業學校

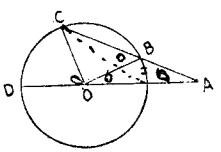
**（幾 何）**

❶ 若 $AB/\!/CD$ 求證 $\angle 1=\angle 2+\angle 3$ （如圖） （10%）




❷ 已知三角形三邊的中點，求作此三角形。 （10%）

❸ 如圖若 $OB=AB$，試證 $\angle COD=3\angle A$ （10%）




**（代 數）**

❹ 簡化 $x^2-[2x^2+x-(3x-1)-x^2]+1$

❺ 試因析分解 $x^2+7xy+10y^2$

❻ 試解 $\sqrt{x+3}+3=x$ (10%)

❼ 試求等差級數 $-1, -\frac{1}{2}, 0, \cdots\cdots$ 的第10項及其總和。(10%)

❽ 解 $\begin{cases} x+y=5 \\ y+z=10 \\ z+x=7 \end{cases}$ (10%)

(算術)

❾ 化簡 $\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2}}}}$ (10%)

❿ 王先生將他的財產45000元分給他的三個兒子，長子得全財產的$\frac{5}{9}$，次子與幼子各得其餘的一半，問三子各得若干元？ (10%)

## 省立臺中師範學校

❶ 有整數，其積爲4704，最小公倍數爲168，問這二整數如何？(用算術解之)

❷ 析下式的因式：
$x(x^2-1)-y(y^2-1)+xy(x-y)$

❸ 解下面分方程式：
$\frac{x^2-3x}{x^2-1}+\frac{1}{x-1}+4=0$

❹ 設 $b$ 爲 $a$, $c$ 的比例中項
求證 $(a-b+c)(a+b+c)(a^2-b^2+c^2)=a^4+b^4+c^4$

❺ $\triangle ABC$ 的一中線爲 $AM$
求證 $\overline{AB}^2+\overline{AC}^2=2(\overline{AM}^2+\overline{BM}^2)$

❻ 四邊形 $ABCD$ 中，$AB$ 與 $CD$ 不平行，$AD$ $BC$ 的各中點爲 $M$ $N$ 求證
$MN<\frac{1}{2}(AB+CD)$

## 省立臺中第一中學

(一) **是非題**：下列各題對的在題前（ ）內填『＋』號，錯的填『－』號（答錯反扣） 10%

❶ $\sqrt{-2a^2b}\cdot\sqrt{-6ab^2c}\cdot\sqrt{-12a^2c^3}=12a^3b^2c^2i$ ……（ ）

❷ $ax^2+2bx-a=0$ 之二根均爲實數……（ ）

❸ 若 $a:b=c:d$，則 $a^3:b^3=c^3:d^3$ ……（ ）

❹ 正 $n$ 角形的每一內角$=\frac{(n-3)}{n}$ 2 Rt∠ ……（ ）

❺ 四邊形之二對邊和等於他二對邊和，則可作一內切圓……（ ）

**(二) 問答題：**（20%）

❶ $(2-3x^2)^4=?$ ❷ $\dfrac{e^{3n}-e^{-3n}}{e^{n}-e^{-n}}=?$

❸ 試寫出一個三元（$x, y, z$）二次同次普通式。

❹ 試述相似多角形之定義。 ❺ 試述圓的軌跡定義。

**(三) 計算或證明下列各題：**（70%）

❶ 甲、乙、丙三人共有100元，甲所有較乙所有少5元，丙所有等於甲、乙二人所有之和，問三人所有各多少？（算術）

❷ 父子二人共做一工程，16日可以完成，今二人合做8日，父因病不能做，子一人繼續獨做10日完成，問父一人獨做這工程，要需多少日？（算術）

❸ 成等差級數的五數之和是40，平方和是410，求此五數。

❹ 從甲站到乙站的火車行四十公里後，機關忽發生障碍，因此每時的速度減四公里，到乙站時遲到一時，若從開始就照後來的速度，還要遲到三十分，求甲乙兩站間的距離。

❺ 由三角形之一頂點，向其對邊之中點所引之直線，小於他二邊之和之半，而大於此和與第三邊之差之半。

❻ 直角三角形之斜邊上頂垂線，爲其所分斜邊所得二線段的比例中項，試證明之。

❼ 圓內二弦正交所成四線分的平分和等於此圓直徑的平方，試證明之。

## 省立臺中第二中學

**I、幾何：**40%

❶ 在 $\triangle ABC$ 的兩邊 $AB$ 及 $AC$ 上順次取 $D$ 及 $E$ 兩點，使 $BD=CE$，若 $BE>CD$. 則 $AB>AC$。（6分）

❷ 順次連結四邊形各邊中點必成一平行四邊形，試證之。（6分）

❸ 兩等弦相交，被交點所分的部份，兩兩相等。（6分）

❹ 若 $AB$ 是直徑，$BD$ 是切於 $B$ 的切線，$DA$ 遇圓周於 $E$，則 $\overline{AB}^2=AE\cdot AD$（6分）

❺ 若E爲 $\square ABCD$ 的對角線$AC$上任一點，求證：$\triangle AEB=\triangle ADE$(6分)

❻ 二圓半徑爲5及3二圓心的距離爲17，求內公切線的長。（10分）

**I、代數：**40%

❶ 分解因式：$(x^2-9)(x^2+4x+4)-(x^2-6x+9)(x^2-4)$（5%）

❷ 解 $\dfrac{1}{x-2}-\dfrac{1}{x-1}=\dfrac{1}{x-4}-\dfrac{1}{x-3}$ （5%）

❸ 解 $\sqrt{x+7-\sqrt{5(x-2)}}=3$ （5%）

❹ 用配方法解 $ax^2+bx+c=0$ 並用判別式，討論其根的性質。（8%）

❺ 一架飛機去轟炸東方距離 150 公里的目標，當時正颳東風，而飛機在無風時的速度爲每時80公里，今去回共費四時，問風速每時幾公里？（7%）

❻ 三數成幾何級數其和爲7，若由此三數，順次加 1, 3, 4，則所得結果三數成算術級數，求此三數。（10%）

**Ⅱ、算術**：20%

❶ 甲、計算下式 $3\times[6+2\times3-(5+4)]-8\div4$（4分）

乙、化簡下式：$\dfrac{1+\dfrac{1}{2}}{2+\dfrac{1}{3}\over 4}$（4分）

❷ 木工4人的工資，等於泥工5人的工資，但木工6人的工資比泥工8人的工資少6元，問木工及泥工的工資各多少？（6分）

❸ 把138元分給甲乙丙三人，甲與乙的比爲 $1:\frac{1}{3}$，乙與丙的比爲5：3，問各得多少元？（6分）

## 省立臺中女子中學

**Ⅰ、代數**

❶ ① 化簡 $\dfrac{x-3}{x-3-\dfrac{x}{x-\dfrac{x-1}{x-3}}}$

② 解 $\dfrac{x^2-5}{x^2+3}+\dfrac{x^2+3}{x^2-5}+2=0$

❷ 姊妹兩人同時解一元二次方程式，姊姊看錯了一次項的係數，求得二根爲 $-2$ 及 $-3$，妹妹看錯了常數項，求得二根爲 $-1$ 及 6，這個方程式眞正的二根爲何？

❸ 桃子100個，分給若干童子，第一個童子得10個，以後的童子，依次每人多得5個，試求童子的人數。

❹ 沿河有甲乙兩鎭，相距12公里，一人從甲鎭到乙鎭，半划船半步行，去時係順流，需時2點30分到達，回時係逆流（也是半划船半步行）需時3點30分，若無水流的速度，則需時2點50分，問划的速度，水流速度，步行速度各幾何？

**Ⅱ、幾何**

❺ 有邊長a尺的正方形木板一塊，鋸成一個最大的圓形木板，問鋸掉的廢板多少？

❻ 圓的內接四邊形 $ABCD$，對角線 $AC$ 垂直 $BD$，其交點爲 $O$，作 $OP\perp CD$，延長 $PO$ 交 $AB$ 於 $Q$ 求證 $AQ=BQ$。

❼ 通過平行四邊形對角線的交點，作互相垂直的二直線，與各邊相交，順次連接此四交點所成的四邊形必爲菱形，試證之。

## 省立臺中農業職業學校

**一、計算題：**（50%）

❶ 求下式的結果：

*a.* $3+\left(-\frac{1}{2}\right)\cdot\frac{1}{3}\times\left(-\frac{1}{4}\right)+\frac{1}{6}\div\left(-\frac{1}{3}\right)$

*b.* $\frac{7}{10}-\left\{\frac{4}{13}\times\frac{5}{8}+\frac{1}{12}\div\left[\frac{3}{4}-\left(\frac{5}{6}-\frac{2}{3}\right)+\frac{1}{9}\right]\right\}$

❷ 求 72，90和162的 *L. C. M.*

❸ 化簡下式：

$$\frac{1}{x}-\frac{1}{x+\dfrac{1}{3x-\dfrac{1}{x}}}$$

❹ 分解下列各式爲因式：

*a.* $24x^2-29xy-4y^2$

*b.* $x^3-3x+2$

❺ 解下列各方程式：

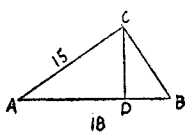
*a.* $\begin{cases}x^2+y^2=185\\x+y=17\end{cases}$

*b.* $2\sqrt{3-7x}-3\sqrt{8x-12}=0$

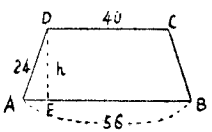
**二、應用題：**（50%）

❶ 龜鶴共42隻，足共108，問各是多少隻？

❷ 直角三角形的弦是18寸，一股是15寸，求此股在弦上的射影。




❸ 等腰梯形的腰是24寸，二底是40寸與56寸，求高。




❹ 父子年齡的和爲100，父子年齡的積之$\frac{1}{10}$，比父年多180，求父子的年齡。

❺ 有一工程，男工與童工各一人共做15日完工，男工7人，童工9人共做2日完工，問男工1人獨做，要幾日完工？童工一人獨做，要幾日完工？

## 省立臺中高級工業職業學校

I 將250元臺幣以年利率3.2%貸出，多少時間後可得本利和300元？

Ⅰ 設 $a:b=c:d$ 求證 $ab+cd:\ ab-cd=a^2+b^2:a^2-c^2$

Ⅱ 解方程式 $5x+\frac{1}{5x}=2$

Ⅳ 求證梯形面積等於$\frac{\text{高}}{2}\times$(上底加下底)

Ⅴ 連結三角形三邊中點所成的三角形和原三角形相似

## 省立臺中商業職業學校

**(一) 選擇：(十分)**

❶ $\sqrt{-a}\sqrt{-b}\sqrt{-c}$ 等於①$-\sqrt{abc}$，②$\sqrt{abc}\,i$，③$\sqrt{-abc}\,i$
④$-\sqrt{abc}\,i$ ……( )

❷ $(a+b)^2$ 等於 ① $a^2+b^2$，② $a^2+2ab+\frac{1}{b^{-2}}$，③ $a^2-2ab+b^2$
④ $(a+b)(a-b)$ ……( )

❸ 三角形外心是：①三中線的交點，②三垂線的交點，③三內角平分線的交點，④三邊垂直平分線的交點。……( )

❹ 連心線大於兩圓半徑的和則兩圓必：①相交，②外切，③相離，④內含。……( )

❺ $n$ 邊形內角和爲 ① $4\angle R$ ② $2(n-2)\angle R$ ③$\frac{2(n-2)}{n}\angle R$ ……( )

**(二) 算術(二十分)**

❶ 甲列車每秒速度比乙列車快 4 公尺，而甲列車長200公尺，乙列車長220公尺，若此二列車相遇至相離費了15秒，問甲乙兩列車每秒速度各多少？

❷ 金 400元分給甲乙丙三人，甲所得比乙多 50元，乙所得是丙的 3 倍，甲乙丙各得多少？

**(三) 代數：(四十分)**

❶ 分解因式：$x^4-2x^3+x^2+5x^2-10x+5$

❷ 已知等差級數的前四項之和是44，第四項是17，求此級數的前三項。

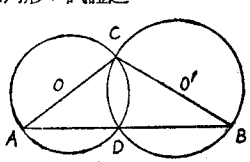
❸ 已知一元二次方程式的兩根是$\frac{2}{3}$和$\frac{4}{5}$，試求這方程式。

❹ 角三角形之面積爲30方公寸，斜邊爲13公寸，試求其他二邊。

**(四) 幾何：(三十分)**

❶ 若三角形之二中線相等，則此三角形爲等腰三角形，試證之。

❷ 兩圓相交於 $CD$，由 $C$ 點引 $CA$, $CB$ 兩直徑，求證 $A$, $D$, $B$ 在一直線上。



# 省立大甲中學

*A.* **算術部份**：20%每題5分

❶ $7\frac{1}{8}-1\frac{11}{16}\times\frac{4}{9}-4\frac{2}{7}\times[9\div(1.9+2.9)-1]$

❷ 有大小兩數，牠們的 $G,C,M$ 是7，$L,C,M$ 是105，求兩數。

❸ 甲箱裝橘100個，乙箱裝橘90個，問要從甲箱移多少橘到乙箱，那麼甲箱的橘數，等於乙箱的$\frac{3}{16}$？

❹ 100和尚，分100個饅頭，大和尚一人得3個，小和尚兩人分一個，問大小和尚各有多少人？

*B.* **代數部份**：（46%）

❶ 分解下列各式的因式（10分）

(*a*) $3x^3y^2+6x^2y^2+xy^2+2y^2$　　(*b*) $4x^2-16-a^2+b^2-4bx+8a$

❷ 解下面各方程式（18分）

(*a*) $\begin{cases}\frac{5}{x}+\frac{2}{y}=-1\\ \frac{3}{x}-\frac{1}{y}=1\frac{3}{5}\end{cases}$　　(*b*) $2x^{\frac{2}{3}}-x^{\frac{1}{3}}-6=0$

(*c*) $\sqrt{x-2}-\sqrt{2x+3}-2=0$

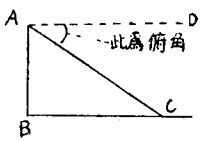
❸ 已知等差級數的首項是138，第十八項是87，求此十八項的和。（6分）

❹ 用二項定理求 $(1.002)^8$ 至第三位小數（6分）

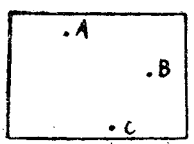
❺ 兩人體重的比是5：6，若每人各增5公斤，則他們體重的比是11：13，問兩人原來體重各多少公斤？（6分）

*C.* **幾何部份**：34%

❶ 有垂直峭壁，豎立河邊，自峭壁頂上，望對岸之俯角爲 45°，設此峭壁高120尺，問河闊若干。（5分）

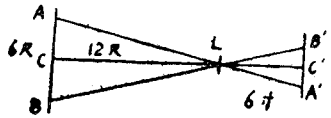



❷ 如下圖 $A,B,C$ 爲三鎭，今欲建一小學校使距 $A,B,C$ 三鎭距離相等，試作圖決定此位置，並證明所求地點，眞確不誤。(即是要作法與證明)(6分)




❸ 圓外切等邊三角形之高，等於圓半徑的三倍，試證之。（6分）

❹ 一點 $A$ 經過照相鏡頭所成的像是 $A'$，作 $AA'$ 必通過收光鏡中心 $L$，同理 $B$ 點像是 $B'$，作 $BB'$ 也必須通過 $L$，故 $A'B'$ 是 $AB$ 的像若 $AB=6$尺，$LC=12$尺，$LC'=6$寸 求 $A'B'$ 長若干？（6分）




❺ 梯形面積等於兩底和與其高相乘之積的一半，試證之。（6分）

❻ 一三輪車輪之半徑爲一尺，自甲村行至乙村，默數其輪各旋轉1200次，問甲乙兩村距離若干？（5分）

## 省立彰化中學

**Ⅰ、算術**

❶ 有果物若干個，若先把他的一半還多一個給與甲，再取其殘餘的一半更多二個給與乙，那麼尚剩四個。問原來的果物多少？又甲乙各得幾多？

**Ⅱ、代數**

❷ 解方程式：

$$(a)\begin{cases}\dfrac{2}{x}-\dfrac{3}{y}=\dfrac{1}{2}\\[2ex]\dfrac{1}{3x}+\dfrac{1}{5y}=\dfrac{1}{5}\end{cases}$$

$$(b)\ \sqrt{x+2}-\sqrt{16-x}=0$$

❸ 兄弟五人，年齡依次差3歲，他們的年齡總和是45歲，求各人的年齡。

**Ⅲ、幾何**

❶ 三角形三中線的和，小於三角形的周長，試證明之。

❷ 求作一圓等於已知圓的三倍。

## 省立彰化女子中學

**一、是法題**（10%）（仔細做，錯了要扣分數）

❶ $\dfrac{-a}{b}=\dfrac{a}{-b}=-\dfrac{-a}{-b}$ ……（ ）

❷ $\dfrac{1}{2}:\dfrac{1}{3}=3:2$ ……（ ）

❸ $\sqrt{-4}=-2$ ……（ ）

❹ $(a+b)(a^2+ab+b^2)=a^3+b^3$ ……（ ）

❺ 二直線相交所成之對頂角相等。……（ ）

❻ 二三角形中，若有二邊彼此對應相等，則第三邊亦相等。……（ ）

❼ 兩圓面積的比等於半徑平方的比。……（ ）

❽ 二平行四邊形，若有二隣邊對應相等，則爲全等形。……（　）

❾ $\frac{1+\sqrt{3i}}{2}=\frac{2}{1-\sqrt{3i}}$ ……（　）

❿ $n$邊多角形內角之和，等於 $2(n-2)$ 直角。……（　）

## 二、計算題（90%）

❶ 化簡 $5-\cfrac{1}{3+\cfrac{2}{4+\cfrac{2}{3}}}$

❷ 某校高一學生共有96人，於暑期分別參加軍中服務，農村服務隊，考生服務隊，參加各隊人數之比爲 5：4：3，問各隊人數若干？

❸ 分解下列各因式：

① $xy^2+xz^2+x^2y+x^3z+yz^2+y^2z+3xyz$

② $x^6-1$

❹ 化簡 $\cfrac{\cfrac{a}{a-b}-\cfrac{b}{b+b}}{\cfrac{a}{a+b}+\cfrac{b}{a-b}}$

❺ 已知方程式 $5x^2+4x+2k-3=0$ 之二根相等，問 $k$ 之值爲何？

❻ 解 $\sqrt{a-x}+\sqrt{x-b}=\sqrt{a-b}$

❼ $\triangle ABC$ 爲圓內接正三角形，$P$爲 $\overset{\frown}{BC}$ 上之任一點，求證 $PA=PB+PC$。

❽ $AD$ 平分 $\angle A$ 之外角交 $BC$ 之延線於$D$，求證：$AB:AC=BD:DC$

❾ 二弦 $AB$, $CD$ 直交於 $E$, 試證：$\overline{AE}^2+\overline{BE}^2+\overline{CE}^2+\overline{DE}^2=$直徑$^2$

# 省立彰化工業職業學校

## 〔一〕填充（每一橫線上，填充適當文字。每小題 2 %，共20%）

❶ $y=kx$ 的式中，$y$ 叫做函數，$x$ 叫做＿＿＿＿，$K$ 叫做＿＿＿＿。

❷ 甲的$\frac{2}{5}$等於乙的$\frac{1}{3}$，則甲是乙的＿＿＿＿倍。

❸ 一線段的中垂線上任何點距線段兩端＿＿＿＿。

❹ 三角形的任一＿＿＿＿等於其二內對角的和。

❺ $a$, $b$ 二數的等比中項等於＿＿＿＿，等差中項等於＿＿＿＿。

❻ 二直線被另一直線所截，所成的同側內角＿＿＿＿，則二直線必平行。

❼ $n$ 角形的外角和爲＿＿＿＿$rt\angle$。

❽ $a^3bc$，$a^2b^2c^2$，$ab^3d^3$ 的最高公因式是＿＿＿＿，最低公倍式是＿＿＿＿。

❾ 平行四邊形的二對角線相等，則爲＿＿＿＿形。

❿ 連三角形兩邊中點的連線，必與第三邊平行，且等於第三邊的＿＿＿＿。

## 〔二〕算術：（每小題10%，共20%）

❶ 某工人工作 5 天得食米33臺斤又6.2元，工作 8 天得食米25臺斤又40.5元。問食米 1 臺斤之價格幾元？又一天之工資幾元？

❷ 一數的$\frac{1}{6}$和牠的$\frac{1}{8}$的積是195075，問這數是多少？

〔三〕**幾何**：(20%)

〔已知〕圓外一點$P$，割線$PAB$，$PCD$與圓相交於$A, B, C, D$. $PA=5$寸，$AB=4$寸，$PC=3$寸。

〔求〕$CD$的長

〔四〕**代數**：(共40%)

❶ 分解 $x^2+2xy^2+y^4-z^6$ (5%)

❷ 有擺12個，欲使其長成等差級數，且最短的爲2寸，最長的爲8寸。試求所需線長共幾尺？(20%)

❸ 解
$$\begin{cases}(x+y)(x+y+z)=273 & \cdots\cdots①\\ (y+z)(x+y+z)=315 & \cdots\cdots②\\ (z+x)(x+y+z)=294 & \cdots\cdots③\end{cases}$$

## 省立彰化商業職業學校

一、**是非題**10%：下列各題認爲對的在(　)內填⊐＋號，錯的⊐－號（每小題1分，答錯倒扣）

❶ $[(a^5)^2]^0=1$ ……(　)

❷ $(\sqrt{5}+\sqrt{3}\,i)(\sqrt{5}-\sqrt{3}\,i)=8$ ……(　)

❸ $log\,(M-N)=log\,M-log\,N$ ……(　)

❹ $a^2-b^2$, $a-b$ 的 $L.C.M.$ 是 $a^2-b^2$ ……(　)

❺ 二次方程式的判別式 $b^2-4ac=0$ 則兩根絕對值相等而符號相反。(　)

❻ 兩三角形有二邊彼此對應相等，則第三邊大的對角也大。……(　)

❼ 兩相似多角形面積的比等於對應邊的比。……(　)

❽ 兩圓相外切有二公切線。……(　)

❾ 圓內接四邊形對角是互爲補角。……(　)

❿ 在同圓或等圓內若兩弦不相等，則大弦距圓心較遠。……(　)

二、**填充題**10%：在下列各題中空白的地方填上適當的詞句。

❶ 方程式中祇有一個未知數，牠的次數是一時，叫做＿＿＿＿方程式。

❷ $a, b$ 二數之等差中項 $A=$＿＿＿＿，等比中項 $G=$＿＿＿＿，調和中項 $H=$＿＿＿＿。

❸ $ax^2+bx+c=a$ ($x$＿＿＿＿＿＿)($x$＿＿＿＿＿＿)

❹ 依二項定理展開 $(x-y)^5=$＿＿＿＿＿＿＿＿＿＿＿＿。

❺ 若 $\frac{a}{b}=\frac{d}{c}=\frac{f}{e}=\cdots\cdots=\frac{3}{5}$則 $a+d+f+\cdots\cdots : b+c+e+\cdots\cdots=$＿＿＿＿＿＿ : ＿＿＿＿＿＿。

❻ 多角形邊數爲$n$時其內角的和＝＿＿＿＿＿＿。

❼ 設等腰三角形之頂角有$2x$度，則每一底角有＿＿＿＿＿＿度。

❽ 兩三角形若有二邊及夾角彼此相等，則此三角形必爲＿＿＿＿形。

❾ 連結三角形兩邊中點的線段與第三邊的關係有＿＿＿＿，＿＿＿＿。

⑩ 直角三角形中的二銳角一爲30°一爲60°，則其斜邊爲最短邊之＿＿＿倍

**三、算術**：20%

❶ 某公司股票每股定價10元，股息年利率4%，又紅利爲股息的25%，今某君有這種股票，一年共得利息550元，問他共有幾股？股息和紅利各多少？

❷ 5角，2角，1角輔幣若干個，共值4元，但2角的輔幣比5角輔幣多1個，恰是1角輔幣的2倍，試求各種輔幣的個數？

**四、代數**：30%

❶ 解方程式：

$2x-17-5\sqrt{2x-3}=0$

❷ 一音樂會賣票，對號票每張5元，不對號票每張3元，今共賣出票142張，得票款534元，問賣出對號票與不對號票各幾張？

❸ 設$\frac{x}{a-b}=\frac{y}{b-c}=\frac{z}{c-a}$，　試證明 $cx+ay+bz=0$

**五、幾何**：30%

❶ 梯形的兩底是12和8，延長不平行的兩邊使相遇於一點，若梯形的面積是90，求延長線所成小三角形的面積。

❷ 設兩圓外切於 $A$, $BC$ 是公切線，試證 $\angle BAC$ 是直角。

❸ 試證連結梯形兩對角線中點的直線等於兩底差的一半。

## 省立員林中學

**I** 分解因子：(20%)

❶ $x^2+\frac{7}{3}x+\frac{2}{3}$　　❷ $(x-4)^2-6(x-4)+9$

❸ $\frac{x^2y^2}{9}-\frac{a^2b^2}{16}$　　❹ $x^4-a^2x^2+2abx-b^2$

**II** 解方程式：(20%)

❶ $\begin{cases}\frac{5}{x-2}+\frac{3}{y-3}=8\\ \frac{4}{x-2}-\frac{2}{y-3}=2\end{cases}$　　❷ $\begin{cases}\frac{1}{x}+\frac{1}{y}=\frac{7}{12}\\ xy=12\end{cases}$

❸ $\sqrt{x+1}=x-5$　　❹ $x^2-(3a+2b)x+6ab=0$

**III** 是非題：(10%)

❶ $3\times3=3^3$ ……( )　　❷ $(a+b)^2=a^2+b^2$ ……( )

❸ $a^{-3}=-a^3$ ……( )　　❹ $2+\frac{1}{2}=2\frac{1}{2}$ ……( )

❺ $\sqrt[3]{a^2}=a^{\frac{2}{3}}$ ……( )

❻ $\sqrt{-a}\sqrt{-b}=\sqrt{(-a)(-b)}$ ……( )

❼ 若兩數是互素數，這兩個數必都是素數。……( )

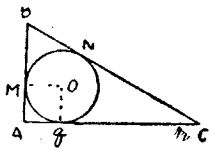
❽ 梯形的中線是聯兩腰中點的線段。……( )

⑨ 凸五角形的五角的和是6個直角。……（ ）

⑩ 順次聯四邊形四邊中點的線段之和，必大於其對角線的和。……（ ）

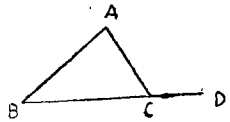
Ⅳ 設 $\alpha$, $\beta$ 爲 $3x^2-4x-1=0$ 之二根，求 $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}$ 之值。（10%）

Ⅴ




如左圖，設直角三角形 $ABC$ 外切於圓 $O$，試證二股 $AB$, $AC$ 的和等於斜邊 $BC$ 與圓 $O$ 直徑的和。（15%）

Ⅵ




設 $ACD$ 是 $\triangle ABC$ 的外角，則 $\angle ACD=\angle A+\angle B$（10%）

Ⅶ 一弦長10尺，距圓心的遠爲12尺，今有一弦長24尺，求其距圓心的遠。（15%）

## 省立員林農業職業學校

❶ 學生96人排成一個3層的空心方陣，問外層每邊人數多少？（15%）

❷ 計算題（30%每小題10%）

① $4+\cfrac{1}{2-\cfrac{3}{4-\cfrac{5}{6}}}=?$

② 分析下列的因式：
$x^4-x^3+2x^2-x+1$

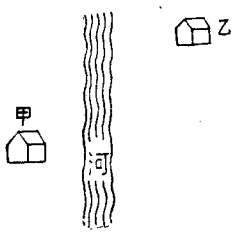
③ 分析下列的因式：
$y^2x-y^2+a^2+2ay+2axy-a^2$

❸ 求二連續整數，其平方之和爲481（15%）

❹ 利用配方法，解方程式 $ax^2+bx+c=0$（10%）

❺ 證明三角形內角的和等於兩直角。（10%）

❻




如下圖甲乙兩家間有一條河，欲做架橋在河上，但是甲乙二家到橋距離需要相等，如何設計及證明。（20%）

## 省立斗六中學

Ⅰ **是非題** 你認爲對的填（○），錯的填（×），答對每題得2分，答錯每題倒扣1分

❶ $\sqrt[3]{36288}=\sqrt[3]{21}\times 12$……（ ）

❷ $\sqrt{-3}\cdot\sqrt{-4}=\sqrt{(-3)(-4)}=\sqrt{12}$……( )

❸ $(a+b)^2=a^2+b^2$……( )

❹ 一弦與其端點切線所成之再等於此弦上之圓周角……( )

❺ 相似多邊形面積的比不等於對應邊平方的比……( )

**Ⅰ 填充題**（每題2分）

❶ $25.2-\{0.\dot{3}+[1-\frac{1}{2}\%+\_\_\_\_+(4-2\frac{1}{3})]\times\frac{1}{7}\}=24\frac{493}{600}$

❷ $\sqrt{a}+\sqrt{b}\,i$ 的共軛複數是_____此二數之積爲_____

❸ 若 $a:b=c:d$ 則應用合分比定理可得_____=_____

❹ $a<b$ 時 $\sqrt{(a-b)^2}=$_____

❺ $ax^2+bx+c=0$ 之二根之和等於_____

❻ $\sqrt{5}$, $\sqrt[3]{11}$, $\sqrt[6]{126}$ 中最大者爲_____

❼ 在圓內相交二弦之交角，可用_____度量。

❽ 圓周角必等於其對弧上之_____之一半。

❾ 弧長=$\frac{\quad}{360}$×圓周

❿ 半徑爲 $r$ 的圓的內接正方形的面積爲_____

**Ⅱ 選擇題** 答對每題得2分，答錯倒扣1分

❶ $\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2}}}}=$ ① $\frac{12}{29}$ ② $\frac{12}{27}$ ③ $\frac{1}{2}$……( )

❷ $\frac{a^{-1}\ b^{-1}}{a^{-1}+b^{-1}}=$ ① $\frac{ab}{a+b}$ ② $\frac{a+b}{ab}$ ③ $\frac{1}{a+b}$……( )

❸ $1,\ \frac{1}{2},\ \frac{1}{2^2}$……之和是 ①無限大 ②等於2 ③小於2……( )

❹ 周長一定面積最大的長方形是 ①矩形 ②正方形 ③菱形 ……( )

❺ 有二圓，其半徑爲 $r$ 及 $R$，設另有一圓，其面積爲該二圓面積的和，則其半徑必爲 ① $r^2+R^2$ ② $\sqrt{r^2+R^2}$ ③ $r+R$……( )

**Ⅳ 計算題** 每題10分

❶ 甲有金是乙所有的3倍，但甲得50元，乙得70元後，則甲所有金便是乙所有的 $1\frac{2}{3}$ 倍，求兩人原有金各多少（算術）

❷ 分解下列各式爲因式

(a) $a^4+a^2+1$　　(b) $a^2(b-c)+b^2(c-a)+c^2(a-b)$

❸ 解聯立方程式 $\begin{cases}\frac{1}{x}+\frac{1}{y}=5\\ \frac{x}{y}+\frac{y}{x}=\frac{13}{5}\end{cases}$

❹ 試證 $1,3,5\cdots\cdots$至第$n$個奇數之總和必爲平方數。

❺ 在一線段 $AB$ 上取一點$C$,在 $AC, CB$ 上向同側作正方形 $ACDE. BCFG$則 $AF\perp BD$。

❻ 求一邊爲$a$之正三角形之面積及該正三角形外接圓半徑。

## 省立嘉義中學

**一、是非題**：對的寫「＋」，錯的寫「－」答錯倒扣。（10%）

❶ $\sqrt{x}+\sqrt{y}$之有理化因式爲$x-y$……（　）

❷ $i^2=\sqrt{-1}\cdot\sqrt{-1}=\sqrt{(-1)(-1)}=\sqrt{1}=1$ ……（　）

❸ $x^2+px+q=0$ 之二根之和爲 $-p$，二根之積爲 $q$ ……（　）

❹ $-8$爲 4與 16之等比中項。……（　）

❺ 任何數之零次方都等於零。……（　）

❻ 直角三角形之一腰之垂直平分線平分其斜邊。……（　）

❼ 設三角形之邊爲 5寸，10寸及18寸，則此三角形爲不可能。……（　）

❽ $n$邊形諸內角之和等於$360°$ ……（　）

❾ 同圓內圓心至弦之垂直距離愈大弦愈大，距離愈小弦愈小。……（　）

❿ 若二角之和爲$90°$且爲隣角，則二角稱補角。……（　）

**二、填充題**（20%）

❶ 兩圓的連心線必（　）且（　）公共弦。

❷ 兩△面積之比必爲（　）乘（　）之比。

❸ $5^2=$（　），$5^{-2}=$（　），$9^{\frac{3}{2}}=$（　）及$5^0=$（　）

❹ $\sqrt[3]{2}\cdot\sqrt[4]{3}=$（　）。

❺ 一數能整除兩數或兩數以上的數叫做（　）。

❻ 於$30°,60°,90°$之三角形，$60°$角所對之邊等於$30°$角所對之邊之（　）倍。

❼ 內接於圓之梯形爲（　）梯形。

❽ 內接正六邊形之邊對（　）度之中心角。

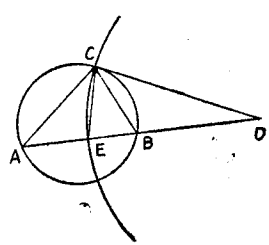
❾ 設一三角形與一平行四邊形有相同之底與高，則平行四邊形面積等於三角形面積之（　）倍。

❿ 設二圓之連心線等於零，則此二圓爲（　）。

**三、計算題**（70%）

❶ 三角形三中線之和，大於其周之四分之三，試證之。

❷ 自 $\triangle ABC$ 之外接圓周上一點 $C$ 作切線 $CD$ 與 $AB$ 之延長線相交於 $D$，以 $DC$ 爲半徑作圓與 $AB$ 相交於 $E$，則 $CE$ 平分 $\angle ACB$ 試證之。




❸ 分解$(a+b+c+d)^2-(a+b-c-d)^2$之因式。

❹ 分解 $x^2-\frac{35}{6}xy-y^2$ 之因式。

❺ 解 $\begin{cases} x^2+y^2=74 \\ xy=35 \end{cases}$

❻ 已知二根爲$(7-\sqrt{5})$及$(7+\sqrt{5})$，求作一元二次方程式。

❼ 作一三角形已知一邊及在此邊上之高與中線（即 $a$, $h_a$ $m_a$）

❽ 於任何三角形二邊之積等於第三邊上之高乘以其外接圓之直徑，試證之。

❾ 比重0.780的酒精同水混合得比重0.925的混合液，求酒精和水的混合比。

❿ 求下列二式的結果到第三位小數。（要草式）。

① $\sqrt{3}=$　　② $\sqrt[3]{2}=$

注意：（9, 10二題用算術做）

## 省立嘉義女子中學

**Ⅰ、是非題：**

❶ 一數的約數的個數雖有限，而其倍數的個數却無限制。……（　）

❷ 一數除以某數，就是乘以某數的逆數。……（　）

❸ $\frac{1}{2}:\frac{1}{3}:\frac{1}{5}=5:3:2$。……（　）

❹ 成數＝子數÷母數。……（　）

❺ 利息與本金成正比例，而與時期成反比例。……（　）

❻ 任何數中絕對值愈大，其值亦愈大。……（　）

❼ $(-a^2)\cdot(-b)\cdot(-c^3)\cdot(-b)=a^2b^2c^3$。……（　）

❽ 除數爲0，被除數不爲0時，其商爲0，除數不爲0，而被除數爲0時，則無意義。……（　）

❾ 二元方程式的圖爲一直線。……（　）

❿ 兩式的公倍式稱爲 *L.C.M.*。……（　）

⓫ 非同種類，同單位的數量，不能直接相比。……（　）

⓬ $\sqrt{75}-\sqrt{20}=3\sqrt{5}$……（　）

⓭ $\sqrt{-5}\times\sqrt{-3}=\sqrt{15}$……（　）

⓮ 凡無理方程式，不一定有根的。……（　）

⓯ 設 $\alpha,\beta$ 是 $ax^2+bx+c=0$ 的兩根，則 $\alpha+\beta=\frac{b}{a}$……（　）

⓰ 兩三角形有三邊彼此對應相等，則兩三角形全等。……（　）

⓱ 等腰三角形的二底角相等。……（　）

⓲ 一三角形有兩邊各等於另一三角形之兩邊，而一雙等邊所對之角相等，則兩形全等。……（　）

⓳ 圓的內接四邊形的對角線相等。……（　）

⓴ 二切圓之連心線不大於其半徑之和。……（　）

㉑ 相似多角形的對應邊相等。……（　）

㉒ 兩三角形有二邊及所夾之角彼此對應相等，則兩三角形全等。…（　）

㉓ 設一三角形之三邊爲 3, 4, 5 則此爲銳角三角形。……（　）

㉔ 圓心角等于所對之弧，圓周角等於所對弧之半。……（　）

㉕ 相似三角形之比，等於其二對應邊之比。……（ ）

Ⅰ、填充題：

❶ 計算長短，容量，輕重的叫做＿＿＿＿，＿＿＿＿，＿＿＿＿。

❷ 整數與分數合成的數，叫做＿＿＿＿。

❸ 將分母相異的二個以上的分數，變爲分母相同，而值並不變的分數，這種方法，叫做＿＿＿＿。

❹ 用一定的金錢買得物品的量與定價成＿＿＿＿。

❺ 凡計算照定價減收若干，叫做＿＿＿＿。

❻ 在正數或負數中取去其性質符號，只論其數字值這數值叫做＿＿＿＿。

❼ 在負號後的括號撤去時，必須將括號內各項的符號＿＿＿＿。

❽ 凡兩代數式中無論用什麼數代替其文字時，其值均相等時叫做＿＿＿＿。

❾ 兩式輾轉相除，適能除盡，這最後的＿＿＿＿叫做 $H.C.F.$。

❿ 設 $a:b=c:d$，則 $a+b:b=c+d:d$，稱爲＿＿＿＿定理。

⓫ $\sqrt[3]{a}$ 和 $\sqrt[3]{b}$ 是同＿＿＿＿根式。

⓬ $a+\sqrt{b}$ 的共軛根數爲＿＿＿＿。

⓭ $\frac{1+i}{1-i}+\frac{1-i}{1+i}$ 的值爲＿＿＿＿。

⓮ 4是2與6的＿＿＿＿中項。

⓯ 凡實係數之一元二次方程式一根爲虛根時，則他一根，必爲＿＿＿＿。

⓰ 三角形三內角之平分線相遇之一公共點，稱爲＿＿＿＿。

⓱ 三角形諸邊之中垂線之交點，稱爲＿＿＿＿。

⓲ 三角形之三高相遇於一公共點，稱爲＿＿＿＿。

⓳ 弦之垂直平分線必通過＿＿＿＿。

⓴ 二相交圓有＿＿＿＿公切線。

㉑ 一平角與一圓最多只有＿＿＿＿交點。

㉒ 設一線分三角形之二邊成比例，則＿＿＿＿ ＿＿＿＿。

㉓ 梯形之面積等於其中線乘＿＿＿＿。

㉔ 圓周與其直徑之比稱爲＿＿＿＿。

㉕ 圓之內接正六邊形之邊等於＿＿＿＿。

Ⅱ $72+\{39+[100-(43-\overline{76-35})]\}=$

Ⅳ 已知方程式 $5x^2+4x+2k-3=0$ 的兩根相等，問 $k$ 應是何數？

Ⅴ 解聯立方程式 $\begin{cases} x-y=4 \\ x^2+y^2=40 \end{cases}$

Ⅵ 圓內接梯形必爲等腰，試證之。

Ⅶ 四邊形 $ABCD$ 之對角線 $AC$, $BD$，相交於 $E$，求證：$\triangle ABC:\triangle CDA=BE:DE$

## 省立嘉義高級農業職業學校

Ⅰ 算 術：

❶ 求 170，2822的最大公約數和最小公倍數。（10分）

❷ 本金3000元，年利率6%，半年結算一次，照複利計算，問二年後本利和多少？（10分）

**Ⅱ 代數：**

一、解方程式（20分）

❶ (a) $x=7-\sqrt{x^2-7}$

(b) $\begin{cases} x^2+y^2=13 \\ xy=6 \end{cases}$

❷ (a) $\sqrt{x+5}+\sqrt{x-4}=9$

(b) $\dfrac{4}{x-2}-\dfrac{1}{x-4}=\dfrac{4}{x^2-6x+8}$

二、設 $log_{10}2=0.30103$，$log_{10}3=0.47712$，求 $log_{10}\dfrac{27}{4}$ 的值。（10分）

**Ⅲ 幾何：**

❶ 正三解形 $ABC$ 之底邊 $BC$ 延長至 $D$，使 $CD=BC$ 則 $\angle BAD=\angle R$（10分）

❷ 設 $\triangle ABC$ 的三中線爲 $AD$，$BE$，$CF$ 求證 $AD+BE+CF<AB+BC+CA$（10分）

❸ 菱形的對角線互相垂直。（10分）

## 省立嘉義工業職業學校

**(一)算術：**（10%）

❶ 化簡 $1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{5}}}}$

❷ 以乙數除甲數時，得整商24，剩餘3。若算到小數第二位時，則得商24，75，沒有剩餘，問甲乙兩數各爲多少？

**(二)代數：**

❶ 計算式證明：20%（每題4分）

① 分解：$x^2+6x+5$　　② 求：$i^3\times i^4$ 之值

③ 化簡：$\dfrac{a+h-1}{1-a-h}$　　④ 求自0至100諸偶數之和

⑤ 化簡：$(-1)^{2m}+(-1)^{2m+1}$

❷ (10%) 解 $\dfrac{x-1}{\sqrt{x}-1}=3+\dfrac{\sqrt{x}+1}{2}$

❸ 等差級數三數的和爲15，各項的平方和爲93，求各項是多少？

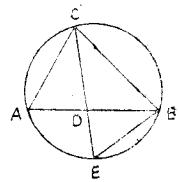
**(三)幾何：**

❶ (10%) 設 $M$ 爲直角 $\triangle ABC$ 斜邊 $AB$ 之中點

求證：$MA=MB=MC$

❷ (15%) 試證一角的平分線上任一點，距角之兩邊等遠。

❸ (20%) 延長內接三角形 $ABC$ 的 $C$ 角的二等分線 $CD$，與圓相交於 $E$，試證 $EB$ 爲 $CE$ 與 $DE$ 的比例中項。




## 省立嘉義商業職業學校

Ⅰ 化簡 $1+\cfrac{1\frac{1}{2}}{2+\cfrac{1}{3+\cfrac{\frac{1}{3}}{4+2\frac{1}{3}}}}$ (10%)

Ⅱ 某人做日工的工資是2元4角，如做夜工，則按日工工資多6角，今知做工16日共得工資42元6角，問其中有幾天是夜工？（算術題）(10%)

Ⅲ 試析 $x^3-4xy^2+x^2y-4y^3$ 的因式。 (10%)

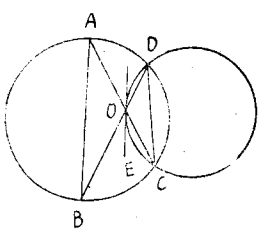
Ⅳ 解：$\begin{cases}2x^2-y^2=23\\4x^2-3y^2=37\end{cases}$ (15%)

Ⅴ 化簡：$\cfrac{9}{3+\sqrt{6}}$ (10%)

Ⅵ 已知：$A$, $C$, $B$, 求作一三角形。 (15%)

Ⅶ 三角形一邊上的中線，小於其餘兩邊的半和。(15%)

Ⅷ $AC$, $BD$ 二弦相交於$O$點，通過 $C$, $O$, $D$ 作外接圓，則此圓之切線 $OE$ 平行於 $AB$. 15%




## 省立嘉義家事職業學校

(Ⅰ) **算術** (20%)

❶ 一斤1元4角之茶8斤與一斤2元5角之茶3斤混合之，得一斤幾元之茶？

❷ 二數之和爲$\frac{17}{19}$，二數之差爲$\frac{3}{97}$，求此二數。

(Ⅱ) **代數** (40%)

❶ 試析 $125x^3-64y^3$ 的因式。

❷ $x+y=2a$ $x-y=26$ 試解之。

❸ 試計算 $\frac{5x}{x^2-1}+\frac{3x}{1-x}$

❹ 試以 $\sqrt[3]{2}$ 乘 $\sqrt[3]{6}+\sqrt[2]{3}$

(Ⅱ) **幾何**：(40%)

❶ 試證平行四邊形的兩組對邊相等，兩組對角相等。

❷ 試證從圓外一點至圓的二切線等長。

## 省立虎尾中學

### Ⅰ 算術

(*A*) 有一個每日工作9小時雖星期日也不休息，16日完成的工程，想星期日休息，從某星期一開始，在第三週的星期六完工，問每日應工作幾時？

(*B*) 甲所有之金是乙所有的三倍，但甲得五十元，乙得七十元後甲所有之金，便是乙所有的 $1\frac{2}{3}$ 倍，求兩人原有金各多少？

(*C*) 在1000公尺划船競賽中，第一船費時 4分5.5秒；第二船費時 4分10秒，但是第一船勝過第二船的不過是船身的一半，問此競賽中所用的船長幾公尺？

### Ⅱ 代數

(*A*) 計算下列各式：

❶ $(-a)(-a^2)\div(-a^2)=$

❷ $-\{-[-(-a^2)]\}-[-(a-1)]=$

❸ $\dfrac{-\frac{1}{3}ab^2}{\frac{3}{5}a^2b}=$

❹ $(a-b)+\dfrac{2ab}{a-b}=$

❺ $\dfrac{1}{a+b}-\dfrac{1}{b-a}=$

❻ $(a+b)\left[\dfrac{a^2-ab+b^2}{a(a^3+b^3)}\right]=$

(*B*) 分解下列各式的因式：

❶ $15a^3x^2-5a^2x^2y$

❷ $x^2-4x-12$

❸ $x^4+x^2+1$

❹ $4x^4-4a^2-4a-1$

❺ $x^4-1$

(*C*) 解下列各方程式：

❶ $2x-[3+(x-7)]=8$

❷ $x^4-4x^2-45=0$

❸ $\dfrac{x-2}{x+1}=\dfrac{x-1}{x+3}$

❹ $x+\sqrt{x+3}=3$

❺ 已知 $\log 3=0.47712$
$\log 9=0.95424$
解方程 $3^{x-1}=9$

### Ⅲ 幾何

(A) 問答題：

❶ 在9點鐘時，鐘面兩針間之角如何？

❷ 設向東行之船改向東北，須施轉何角？

❸ 鐘錶上長針走3周角時，短針走幾平角？

❹ 於平行四邊形內何角相等？

❺ 用文字 s 所代表者爲何？

❻ 設將圓餅切開爲相等12塊，則每一中心角如何？

❼ 設直角三角形之斜邊爲15寸，則其斜邊上中線之長如何？

❽ 設三角內聯結其二中線，末端之線長 6 寸則其對邊之長如何？

❾ 二角的兩邊彼此垂直時，兩角的關係如何？

❿ 三角形的切圓，外接圓的圓心是什麼點？

(B) 計算證明題：

❶ 梯形之高爲 4，而面積等於底 8 高 9 之矩形面積，求其中線。

❷ 矩形之面積爲 108 方寸，而其底 3 倍於高，求其底和高？

❸ 設 $BE$, $CF$ 爲三角形的垂線，$BC$ 的中點爲 $P$, 則 $PE=PF$。

❹ 二個同心圓中，大同的弦切於小圓，則以此弦做直徑的圓，等於原二圓所成的環。

## 省立虎尾女子中學

### 一 算術

❶ 甲乙丙三人合資營商，得紅利1375元，現在想按投資金額與投資月數分配紅利，若他們投資金額之比爲5：4：3，投資月數之比爲1：2：3，問各人應分紅利多少？（13%）

❷ 臺西汽車公司15分鐘生斗南一次，自上午6點開始，設某旅客上午8點10分到車站候車，問應坐第幾次車？又等候時間多少分？（12%）

### 二 代數

❶ 分解下列因式：（12%）

(i) $16x^5-81xy^4$　　(ii) $x^6-1$

❷ 解聯立方程式：（12%）

$$\begin{cases} x^2-4xy-x+y=28\cdots\cdots\cdots\cdots① \\ x-3y=9\cdots\cdots\cdots\cdots② \end{cases}$$

❸ 一人工作第一天的工資是4元，以後逐日增加工資3角，今此人共作工十天，問第十天的工資是多少元？又十天共得工資多少元？（13%）

### 三 幾何

❶ 設 $E, F, G, H$ 順次爲四邊形各邊的中點，求證 $EG$，$FH$ 互相平分(12%)

❷ 兩圓相外切，過切點作一公割線，則公割線所成的兩弦和兩圓的半徑成比例（13%）

❸ 圓內接正六邊形的面積等於其外切正六邊形面積的$\frac{3}{4}$（13%）

## 省立臺南師範學校

**I 算術**：（每題7分）

❶ 化簡 $3-\cfrac{1}{2+\cfrac{2}{3\div\cfrac{1}{3}}}$

❷ 求 465，3255，1302 的最大公約數。

❸ 本金500元，年利2分4厘，一年六個月後可收回本利和各多少？

❹ 某一工程，甲作12日可成，乙作8日可成，丙作6日可成，今甲乙兩人同作2日後，甲生病由丙代替，問幾餘工程幾日可以完工？

**II 代數**：每題（12分）

❶ 解 $\dfrac{3}{x+1}-\dfrac{2}{x+2}=\dfrac{1}{x+3}$ ❷ 解 $\begin{cases}x+y=8\\x^2+y^2=50\end{cases}$

❸ 化簡 $\dfrac{1}{x-a}-\dfrac{1}{x+a}-\dfrac{2a}{x^2+a^2}-\dfrac{4a^3}{x^4+a^4}$

**III 幾何**：（每題12分）

❶ 設自等腰 $\triangle ABC$ 之一邊及他邊延長線上，截取二相等線段 $BD$ 及 $CE$ 試證 $DE$ 爲底邊所平分。

❷ 設內接四邊形 $ABCD$ 之邊 $AB$ 與 $DC$ 延長相交於 $E$ 而 $\angle DBA=\angle CBE$，則 $AD\times BE=CE\times BD$

❸ 在 $\triangle ABC$ 內 $AB>AC$，$AD$ 爲中線，則 $\angle BAD<\angle CAD$ 試證之。

## 省立臺南第一中學

**一、是非題**：（10%）對的寫是不對的寫非。

❶ 算術平均大於幾何平均。……（ ）

❷ 凸 $n$ 邊形的對角線有 $\dfrac{n}{2}(n-3)$ 條。……（ ）

❸ 有方向相反二地方的經差是這二處經度之和。……（ ）

❹ 一元二次方程式的判別式爲零，則方程式有二相等虛根。……（ ）

❺ 不相交的二圓必有二條公切線。……（ ）

❻ 若 $a:b=c:d$ 則 $a+b:c+d=a-b:c-d$ ……（ ）

❼ 繁分數是由內逐次向外化去。……（ ）

❽ 三角形中大邊所對的角比小邊所對的角大。……（ ）

❾ $\sqrt{a+b}=\sqrt{a}+\sqrt{b}$ ……（ ）

❿ 各對邊相等的平行四邊形叫做菱形。……（ ）

**二、填充題**：（30%）

❶ _____ $\times(a^2+b^2+c^2-ab-bc-ca)=a^3+b^3+c^3-3abc$

❷ 如果圓柱體的半徑 $r$ 增爲三倍，而且高 $h$ 也增爲三倍時，體積是_____倍。

❸ 相交二圓的連心線＿＿＿＿平分公弦。
❹ 字典一本定價＿＿＿＿之售價爲112.5元，即有75%（75折）的折扣。
❺ 1，＿＿＿＿，3，$-3\sqrt{3}$，＿＿＿＿是一等比級數。
❻ 在一平面內與相交直線等距離點的軌跡是直線所成兩組對頂角的＿＿＿＿。
❼ 一般說，某變數的一次函數圖形是，＿＿＿＿二次函數圖形是＿＿＿＿。
❽ 圓的對稱軸是＿＿＿＿，對稱中心是＿＿＿＿。
❾ 每公斤2元5角的醬油＿＿＿＿公斤與1元6角的醬油5公斤混合成每公斤2元的醬油。
❿

| $x$ | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|
| $y$ | 16 | 18 | 20 | 22 | 24 | 26 | | |

**三、計算及證明題：**（60%）

❶ 比較 $\sqrt{2}$，$3\sqrt{3}$　$6\sqrt{7}$ 的大小（6%）

❷ 簡化 $x^{\frac{1}{2a-3b}} \cdot x^{\frac{1}{2a+3b}} \cdot x^{\frac{4a}{4a^2-9b^2}}$（6%）

❸ 計算 $1-\cfrac{4}{5+\cfrac{3}{4-\cfrac{1}{3}}}$（6%）

❹ 兩正方形面積的和是20平方公寸，如其長增加4公寸寬增加一公寸，則其面積的和變爲58平方公寸，求其一邊之長。（8%）

❺ 兩個相似三角形中，對應高分成的對應三角形也相似。（8%）

❻ 求在三角形內作一線和底邊平行到兩腰爲止，且使所作的線等於該線和底邊在兩腰所截兩線段的和。（8%）

❼ 有一長方形的木板長爲143公分，寬爲221公分。今欲將其鋸成相同的最大正方形，問恰可有幾個？（8%）

❽ 有一直角三角形三邊爲3,4,5，試求對應斜邊之高。（10%）

## 省立臺南第二中學

**I、填空題：**（每題一分）

❶ 一重噸＝＿＿＿＿磅，一輕噸＝＿＿＿＿磅。
❷ 地球繞太陽一週需＿＿＿＿日，4年的誤差約＿＿＿＿日。
❸ 兩地經度相差1°時，時間相差＿＿＿＿，相差1′時，時間相差＿＿＿＿。
❹ 比較關係以適當名詞列入下表：

| 百分法 | 子　數 | 母　數 | 百分率 |
|---|---|---|---|
| 比 | | | |
| 分　數 | | | |
| 除　法 | | | |

❺ 年利一分＝_____%，月利一分＝_____%，日利一分＝_____%。
❻ 定價100元，實價65元，合我國_____折，合西洋_____扣。
❼ $a^0$＝_____
❽ $(\sqrt[n]{a})^n$ ＝_____
❾ $(3x^{-1})^{-1}$＝_____
❿ $\frac{a^2-b}{a-\sqrt{b}}$＝_____
⓫ $\sqrt{5+2\sqrt{6}}$ ＝_____
⓬ $\frac{1}{\sqrt{a}-\sqrt{b}}$＝_____
⓭ $i^7$＝_____，$i^{10}$＝_____
⓮ $mx^2+nx+r=0$ 中二根之和爲_____二根之積爲_____。
⓯ $2x^4-x^2-3$＝（　　）（　　）
⓰ $a^4+a^2b^2+b^4$＝（　　）（　　）
⓱ $x^{2n}-2x^n+1$＝（　　）（　　）
⓲ 在 $x^2+2bx+c=0$ 中其根之判別式爲_____。
⓳ 625與1之間三個等比中項爲_____ _____ _____
⓴ 垂足爲_____。
㉑ _____叫鈍角 _____叫銳角
㉒ 二平行線間公垂線的長爲_____。
㉓ _____叫菱形。
㉔ 多角形各內角之和＝_____
㉕ 正多邊形之面積爲_____。
㉖ 圓弧長度＝_____
㉗ 三角形之垂心是_____。
㉘ 兩圓之連心線等於兩圓半徑之和，則外公切線數有_____，內公切線數有_____。

**Ⅰ、算術：**（每題4分）

❶ $(1\frac{1}{5}+3\frac{1}{3}\times\frac{3}{8})\div[(4-1\frac{1}{2})\times\frac{1}{2}+2\frac{4}{5}]$＝

❷ $\dfrac{1-\dfrac{1}{2-\dfrac{1}{3}}}{1+\dfrac{1}{2+\dfrac{1}{3}}}$＝

❸ 甲的身長比乙的身長高乙的5%，乙的身長比丙的身長低丙的5%，那麼甲丙兩人那個高？

❹ 分72爲二數，使一數的3倍比另一數的4倍還多6，求此二數。

**Ⅱ、代數：**（每題4分）

**化簡：** ❶ $\dfrac{1}{x^2-\dfrac{x^3+1}{x+\dfrac{1}{x-1}}}$　❷ $(a-bi)^2\pm(a+bi)^2=$

❸ $\dfrac{1+i}{1-i}\pm\dfrac{1-i}{1+i}=$

**解方程式：**

❹ $\begin{cases}x^2+y^2=97\\xy=36\end{cases}$　❺ $5\sqrt{1-x^2}=7-5x$

**分解因式：**

❻ ① $a^2-a-c^2+c=$　② $x^4-x^3+2x^2-x+1=$

❼ 已知方程式 $3kx^2-4x+5=0$ 之兩根相等求 $k=$？

❽ 設 $\alpha,\beta$ 是方程式 $ax^2+bx+c=0$ 之二根試求 $2\beta,\dfrac{1}{2\beta}$ 爲根之方程式。

**Ⅳ、幾何：**（每題4分）

❶ 直角三角形斜邊上的中點與各角頂等距離。

❷ 四邊形對角線的和大於他的半周。

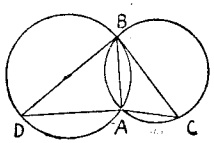
❸ 在 $\triangle ABC$ 的中線 $AM$ 上取中點 $N$，連 $BN$ 交 $AC$ 於 $P$ 點，證明 $AP=\dfrac{1}{3}AC$。

❹ 如右圖設兩圓相交於 $AB$，作 $EC$，$BD$ 兩弦各切於他圓，試證 $AB$ 是 $AC$ 和 $AD$ 的比例中項。

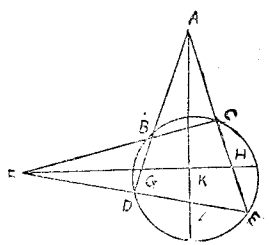
❺ 如下圖將一圓內接四邊形的二組對邊各各引長相交於 $A,F$，則 $\angle A$ 和 $\angle F$ 的平分線必互相垂直。

❻ 試變一矩形爲等積之正方形。

（右圖）




（下圖）




## 省立臺南女子中學

**一、是非題**（是者於括弧內寫「＋」號，非者寫「－」號）　（10%）

❶ 正三角形之面積等於其一邊之平方。……（　）

❷ 梯形之面積等於其中線與高之乘積。……（　）

❸ 菱形非正多邊形。……（　）

❹ 三角形三邊之垂直平分線必交於一點，此點稱爲三角形之垂心。（　）

❺ $(a^m b^n)^p=(a\ b)^{mnp}$……（　）

❻ 設 $a=b=c$，則 $\dfrac{1}{a}=\dfrac{1}{b}=\dfrac{1}{c}$……（　）

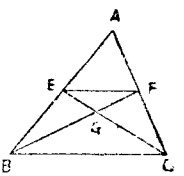
❼ 設 $a>b$, 則 $-a>-b$ ……（ ）
❽ 設 $x$ 等於任何數，則 $x^0=1$ ……（ ）
❾ $\sqrt[4]{-a^{16}}=\pm a^4$ ……（ ）
❿ $\sqrt[m]{a^n}=a^{\frac{m}{n}}$ ……（ ）

二、問答題： (10%)

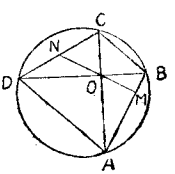
❶ 說明弓形與扇形之區別。
❷ 何謂正多角形。
❸ 試述菱形正方形之定義。
❹ 何謂三角形之外心，內心，重心，垂心。
❺ 方程式與恒等式有何區別。
❻ 怎樣才是對稱方程式，試舉例說明之。
❼ 因式與質因式有何區別。
❽ 解釋係數的意義。
❾ 甚麼叫作絕對值。
❿ 試舉例說明升冪和降冪式之含義。

三、演算題： (80%)

❶ 設三角形之重心爲 $G$，又 $AB$, $AC$ 之中點爲 $E$, $F$, 求 $\triangle ABC$ 與 $\triangle EFG$ 面積之比。（15分）




❷ 圓之內接四邊形 $ABCD$ 若兩對角線直交，則由其交點至任意邊所引垂線依反對方向延長時，將對邊二等分。（15分）




❸ 解方程式： $(x-2)(x-5)(x-7)=8\cdot5\cdot3$ （15分）
❹ 分解因式： $x^3+x^2-17x+15$ （10分）
❺ 有三數爲等差級數，其和爲18，其平方之和爲126，求各數。（15分）
❻ 小數爲大數三分之二，若兩數各加十，則小數爲大數十一分之九，問兩數如何？（10分）（注意：限用算術解答）。

## 省立臺南高級工業職業學校

I 基本常識測驗（30%）

填空：（試在下列各題的橫線上，填寫適當的答案）

❶ 同分母的分數＿＿大的一個其值＿＿同分子的分數＿＿小的一個其值大。

❷ 地球繞太陽一週需＿＿＿日，四年的差誤約爲＿＿＿日。
❸ 兩地經度相差 1° 時，時間相差＿＿＿若相差1′時，時間相差＿＿＿。
❹ 何謂質數？＿＿＿＿＿＿。
❺ $(x-\frac{1}{a-c})a^2-c^2=$
❻ $3\div a^{-2}=$
❼ $i^7=$＿＿＿ $i^{15}=$＿＿＿
❽ $27a^2b^3$ 和 $3b$ 的比例中項爲＿＿＿。
❾ $9997^3=$＿＿＿。
❿ $(1-2y)^5=$＿＿＿＿＿＿。
⓫ $(3+i)\cdot(3-i)=$
⓬ $(a+bi)^2-(a-bi)^2=$
⓭ $\frac{3+2i}{4-3i}$
⓮ 兩角的和爲一周角這兩角叫＿＿＿＿＿＿。
⓯ 一個定理可分折爲兩個部份，一爲＿＿＿，一爲＿＿＿。
⓰ 到三角形各頂點等距離的點叫三角形的＿＿＿＿＿＿。
⓱ 從三角形各頂點到對邊或對邊延長線上所引之垂線叫：＿＿＿＿＿＿
和三角形三邊等距離的點，叫三角形的＿＿＿＿＿＿。
⓲ 二平線間公共垂線的長叫做＿＿＿＿＿＿。
⓳ 幾何學上推理和證明的方法有＿＿＿法和＿＿＿法。
⓴ $a,b$ 二數之等差中項，等比中項，調和中項，＿＿＿最大＿＿＿最小。

## Ⅰ 算術（10%）

❶ 甲乙丙三人合資經商得紅利1375元，現在想按投資金額和投資月數分配紅利若他們投資金額之比爲 5：4：3 投資月數之比爲1：2：3 問各人應分紅利多少？

❷ 本校此次投考人數爲 816人，內分機械，電機，土木，化工四科，各科報考人數之比率順次爲6：5：3：2，問各科報考人數爲若干？

## Ⅱ 代數（40%）

❶ 試因式分解：(a) $x^2-x-y^2+y=$

(b) $a^4-a^3+2a^2-a+1=$

❷ 解聯立方程式：(a) $\begin{cases}\frac{1}{x}-\frac{2}{y}=7\cdots\cdots①\\ \frac{3}{x}+\frac{4}{y}=1\cdots\cdots②\end{cases}$

(b) $\begin{cases}x^3-y^3=218\\ x-y=2\end{cases}$

❸ 解下列各方程式：(a) $2\sqrt{x}-\sqrt{4x-11}=1$

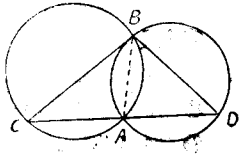
(b) $2x^4-3x^3-4x^2-3x+2=0$

❹ (a) 已知方程式 $3Kx^2-6x+1=0$ 之兩根相等，求 $K$ 之值。

(b) 自飛機中投擲炸彈，第一秒落下16.1呎，第二秒落下 48.3 呎，第三秒落下80.5呎，問第15秒落下多少呎？

## Ⅲ 幾何（20%）

❶ 如下圖，兩定圓相交於 $A,B$ 二點，過 $A$ 點引直線交兩圓周於 $C,D$ 兩點，求證 $\angle CBD$ 是一定。

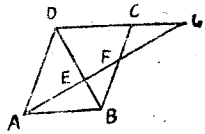



❷ 在 $\triangle ABC$ 的中線 $AM$ 上取中線 $N$ 連 $BN$ 交

$AC$於$P$點，證明$AP=\frac{1}{3}AC$

❽ 試製一三角形爲等積之正方形。

❾ 如左圖，$ABCD$是平行四邊形$AG$是直線，試證$\frac{EF}{EA}=\frac{EA}{EG}$




## 省立工學院附設工業職業學校

**甲 是非題**（對的寫「是」，不對的寫「非」；每題2分，答錯要倒扣）

❶ 1公尺＝0.01公里 ……（ ）

❷ 1公斤＝0.01克 ……（ ）

❸ 凡能以2除盡的數叫做偶數 ……（ ）

❹ $(a^n)^m=a^{mn}$ ……（ ）

❺ $a^3+b^3=(a-b)(a^2+ab+b^2)$ ……（ ）

❻ 1、3、5、7、9 ……是等差級數 ……（ ）

❼ 等邊三角形每一內角都是30° ……（ ）

❽ 正三角形任一角的平分線必平分該角所對之邊 ……（ ）

❾ 圓的面積＝$2\pi r$ ……（ ）

❿ 設已知圓之直徑爲$D$，則其內接正方形面積＝$\frac{D^2}{2}$ ……（ ）

**乙 填充題**（每題2分）

❶ 兩個小數相乘，被乘數有兩位小數，乘數有一位小數，其結果應有（ ）位小數

❷ （ ）×（1＋利率×時期）＝本利和。

❸ 商×（ ）＝被除數。

❹ $8x^3-1=$（ ）（ ）

❺ $x^4-1=0$的四個根爲（ ），（ ），（ ），（ ）。

❻ $i^4=$（ ）。

❼ 任意三角形三內角之和等於（ ）度。

❽ 直角三角形的三邊爲$a$，$b$，$c$，設$c$爲斜邊，則$c=$（ ）

❾ 等腰三角形的頂角平分線必（ ）且（ ）底邊。

❿ 三角形的面積等於（ ）

**丙 演算題**（每題20分）

❶ 大小二數之和等於二數差的3倍，試求該兩數最小的正整數數字。

❺ 解方程式$\sqrt{2x-5}-\sqrt{x+2}=0$

❸ 設知等邊三角形一邊爲$2x$；試求該三角形之面積。

# 臺南市私立長榮中學

**Ⅰ、是非**：下面各題你認爲對的便在題後括弧內寫「＋」號，錯的便寫「－」號（做錯扣分塗改不計分）。（10%）

❶ $(x-y)^2=x^2-y^2$ ……（　）

❷ $x^3-2x^2-5x+6=(x+2)(x-1)(x-3)$ ……（　）

❸ $(a-b+c)^2=a^2+b^2+c^2-2(ab+bc-ca)$ ……（　）

❹ 圓內接四邊形的對角互爲餘角。……（　）

❺ 弦切角是切線和過切點的弦所成的角。……（　）

**Ⅱ、填充**：（15%）

❶ $\frac{16x^2}{5y^3}\div$（　　）$=10xy$

❷ 一元二次方程式 $ax^2+bx+c=0$ 的根公式是（　　），判別式是（　　）。

❸ 等比級數 $-\frac{1}{2}$，1，2，……的公比＝（　　），第 $n$ 項＝（　　）。

❹ 三角形的重心是（　　）。

❺ 半圓內的圓周角是（　　）。

**Ⅲ、改錯**：下面各題如有錯誤，在錯誤地方引一直線然後將其正確答案寫出於題後括弧裏，如完全對者那在題後括弧裏填「○」號。（15%）

❶ $x^3+y^3=(x+y)(x^2-xy+y^2)$ ……（　）

❷ 等差級數 1,3,5 ……的公差＝2，第 $n$ 項＝$2n+1$ ……（　）

❸ 正十角形的一內角是 100 度。……（　）

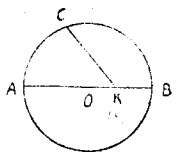
❹ 多邊形的各頂點都在一圓周上，此多角形叫內接多邊形。……（　）

❺ 二相似多角形面積的比，等於對應邊的比。……（　）

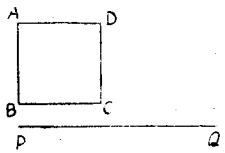
**Ⅳ、有三個連續的整數，前一個與後一個的乘積加上中間的一個，結果爲29，試求此三數。**（15%）

**Ⅴ、** 由 $\begin{cases}x+2y-3z=0\\5x-6y+7z=0\end{cases}$ 求 $x:y:z$ 之值。（15%）

**Ⅵ、如下圖過圓 $O$ 內一定點 $K$，作直徑 $AB$，圓周上任取一點 $C$，連結 $KC$ 即 $KA>KC$，$KC>KB$。**（15%）




**Ⅶ、作一矩形，使等於已知正方形 $ABCD$，且底與高的和等於已知線段 $PQ$。**（15%）



## 省立高雄女子師範學校

❶ 簡化：$\dfrac{\frac{1}{3}-\frac{1}{2}}{2\frac{4}{5}-1\frac{3}{10}}$

❷ 試析$a^2-b^2+c^2-d^2-2(ac-bd)$的因式。

❸ 求$\dfrac{x^3-3x^2+3x-1}{8x^3+12x^2+6x+1}$的立方根。

❹ 本金 $500，年利率爲4%，依半年一期的複利計算利息，求2年末的本利和。

❺ 二數的和爲11，其倒數的差爲$\dfrac{5}{24}$，求這二數。

❻ 解下列聯立方程式：$\left.\begin{aligned}x-y&=4\\x^2+y^2&=40\end{aligned}\right\}$

❼ 割線截兩同心圓，試證被兩圓所截的二段相等。

❽ 求證三角形的面積等於底與高乘積的一半。

❾ 求證全等三角形的二外接圓相等。

❿ 從等腰三角形頂點到底邊內任一點的連線，必比一腰小。

## 省立高雄中學

❶ 化簡下式 $1+\dfrac{1}{2+\dfrac{1}{3+\dfrac{1}{4+\frac{1}{5}}}}$ （算術）

❷ 其數加上1，減去2，乘以3，除以4得9，求某數？（算術）

❸ 分解因式：$abcx^2-(a^2b^2+c^2)x+abc$

❹ ① 求$100^5=$？ ② 比較$\sqrt{2}$與$\sqrt[3]{3}$之大小。

❺ 求 $\dfrac{1+i}{1-i}+\dfrac{1-i}{1+i}=$？

❻ 化簡 $2\sqrt{27}-6\sqrt{75}-3\sqrt{\frac{1}{3}}+2\sqrt{3}$

❼ 三數之比爲 1：2：3，而其平方和爲56，求此三數？

❽ 解聯立方程式：$\left.\begin{aligned}x^2+y^2&=97\\xy&=36\end{aligned}\right\}$

❾ 試證三角形一邊上的中線小於其餘二邊之半和。

❿ 同圓或等圓內兩弦不等，則大弦距圓心較近，試證明之。

⓫ 三角形一外角的平分線外分對邊所成兩線段，和其餘二邊成比例，試證之。

⓬ 設 $M$ 與 $N$ 爲 $\triangle ABC$ 中 $AB$ 與 $AC$ 之中點。

試證 $\triangle MNB=\dfrac{1}{2}\triangle MBC$

⑬ 求作自圓外一已知點作此圓之切線。

（註：算術每題6分，其餘每題8分）。

## 省立高雄女子中學

一、是非：（15%）下列各題中，你認爲對的，請在括弧內劃「＋」號，不對的劃「－」號，答錯倒扣。

❶ $(a^m)^n=a^{m+n}$ ……（ ）

❷ 因 $(x-1)(x-2)=1$，則 $x-1=1$, $x-2=1$, 故 $x=2$, $x=3$……（ ）

❸ $x^4+x^2+1=(x^2+x+1)(x^2-x+1)$……（ ）

❹ $\frac{x^2-1}{x^4-1}=\frac{-1}{x^2-1}$……（ ）

❺ $(x-y)^3=(y-x)^3$……（ ）

❻ $\sqrt[3]{2}\ \sqrt{3}=\sqrt[3\times2]{2\times3}=\sqrt[6]{6}$……（ ）

❼ $a^{-n}=a^{\frac{1}{n}}$……（ ）

❽ $\sqrt{-3}\times\sqrt{-6}=\sqrt{(-3)(-6)}=\sqrt{18}=3\sqrt{2}$……（ ）

❾ $a\div b\times c=a\div bc=\frac{a}{bc}$……（ ）

❿ 四邊形的二隣角相補，可作一外接圓……（ ）

⓫ 正多角形的面積等於周界和邊心距的相乘積。……（ ）

⓬ 梯形的面積等於高與中線的相乘積。……（ ）

⓭ 一三角形祇可作一內切圓，一外接圓，和一旁切圓。……（ ）

⓮ 二圓連心線的長等於二圓半徑的和時，可作二外公切線，和一內公切線。……（ ）

⓯ 兩三角的角對應相等，則兩三角形全等。……（ ）

二、填充：（15%）請用適當的字或詞句填在下列各題的空白裡。

❶ 凡除掉 1 和本數以外，沒有其他因數的整數叫做＿＿＿＿。

❷ 甲數可被乙數整除，則甲數叫做乙數的＿＿＿＿，乙數叫做甲數的＿＿＿＿。

❸ $\frac{1}{x-1}-\frac{2x-1}{x^2-1}=\frac{x+1+\square}{x^2-1}$。

❹ 如 $a:b=c:d$，則 $b:a=\square:\square$。

❺ $2\sqrt{32}=2\sqrt{16\times2}=(2\square4)\sqrt{2}=\square\sqrt{2}$。

❻ 如 $\alpha$, $\beta$, 爲 $ax^2+bx+c=0$ 之二根，則 $\alpha+\beta=\square$, $\alpha\beta=\square$

❼ $(x+y-z)(x-y+z)=[x\square(y-z)][x\square(y\square z)]$。

❽ 將下列級數再寫出三項

$a$, $1+4+7+10+$＿＿＿＿$+$＿＿＿＿$+$＿＿＿＿$+\cdots\cdots$

$b$, $2+4+8+16+$＿＿＿＿$+$＿＿＿＿$+$＿＿＿＿$+\cdots\cdots$

❾ 正三角形的每邊爲 $a$，則高等於＿＿＿＿。

❿ 三角形的內切圓半徑爲 $\Upsilon$，半周邊長爲 $S$，則 $\Upsilon=$＿＿＿＿。

⓫ 三角形的三中線相交於一點，此點與各頂點的距離，等於各中線的＿＿。

⑫ 三弦相交所成的角可用＿＿＿＿＿＿來量度。

⑬ 圓的半徑爲 $r$，則圓心角 $m°$ 所對弧的長，等於＿＿＿＿。

⑭ $a,b,c$ 爲 $\triangle ABC$ 的三邊，若 $a^2+b^2=c^2$ 則 $a$ 在 $b$ 上的正射影等於＿＿＿＿。

三、計算：(70%)

❶ 某人於25歲時，向保險公司，保長期壽險，保險額5,000元，每年的保險率是25%，此人80歲時方才死去，問保險公司賠錢或賠錢的數目？(5分)

❷ 以某數除2323，餘23；以某數除4247餘22；以某數除5346，餘21；該數最大的數爲若干？(5分)

❸ 試化簡 $x^3-\dfrac{x^2}{1+\dfrac{1-x}{x-\dfrac{1}{x}}}$ (6分)

❹ 試證 $4x^2+4(a+c)x-(b^2-4ac)=0$ 有二實根。(6分)

❺ 試解 $\begin{cases}x^4+x^2y^2+y^4=133\\x^2-xy+y^2=7\end{cases}$ (6分)

❻ 設有一工程，$AB$ 二人合做15日可以完工，今 $A,B$ 合做6日後，所餘工程由 $B$ 一人獨做，24日完工，問由 $A,B$ 每人獨做，各需幾日完工？(6分)

❼ 已知三數成等差級數，他們的和爲3，他們平方和爲131，求這三數？(6分)

❽ 延長直徑 $AB$ 至 $C$，再從 $C$ 作圓的切線，若 $AB=30$，$BC=2$，求切線的長？(6分)

❾ 證明：等圓內接三角形，面積的比等於三邊乘積的比。(6分)

❿ 證明：自等邊三角形內一點作三邊的垂線和爲一定。(6分)

⓫ $A'.B'.C'$. 順次爲 $\triangle ABC$ 三邊的三等分點，$\triangle A'B'C'=\dfrac{1}{3}\triangle ABC$ (6分)

⓬ 正多邊形的內角爲162°，求該多邊形的邊數？(6分)

## 省立高雄工業職業學校

I 算術

❶ 甲有款250元，乙有款45元，丙有款35元，問甲給乙丙各多少則三人的款數才相等？

❷ 某人初次取出存款 $\dfrac{1}{3}$，次存入800元，後取出當時的 $\dfrac{3}{4}$，尚餘300元，問此人原來存款多少元？

II 代數

❸ 解方程式 $\begin{cases}\dfrac{5}{x}+\dfrac{6}{y}=3\\\dfrac{15}{x}-\dfrac{3}{y}=2\end{cases}$

❹ 解方程式 $\dfrac{x-2}{x-1}=\dfrac{x+1}{x+3}$

❺ 分解 $(a)\ 2xy-x^2-y^2+a^2+b^2+2ab$, 及 $(b)(a+b)^3-(b-a)^3$ 的因式。

❻ 連續三整數的平方和爲110，求這三數。

❼ 甲乙兩車從東西相距240公里的兩站，同時相向而行，相遇後甲經4小時到西站，乙經9小時到東站，求甲乙兩車每小時的速度。

**Ⅱ 幾何**

❽ 三角形底邊上的中線，小於兩腰和的一半。

❾ 連結三角形相鄰各邊中點的線段，將原形分成四個全等三角形。

❿ 二圓外切於 $A$,過 $A$ 作二直線，一線與二圓相交於 $B,C$ 他線與二圓相交於 $D,E$。求證 $BD \parallel EC$。

## 省立高雄商業職業學校

（注）除了第五大題20分外每一大題10分

(1) 是非題：對的寫（○），不對的寫（×）

❶ $x^2+4x+2=0$ 之二根是實數……（ ）

❷ 父子兩人的年齡成正比例。……（ ）

❸ 犬2步的距離，等於兔3步，若犬1步的距離爲$a$尺，則兔1步爲 $\frac{2}{3}a$尺。……（ ）

❹ 若 $a^2>b^2$，則$a>b$或$a<b$。……（ ）

❺ $1, \frac{1}{2}, \frac{1}{2^2}, \frac{1}{2^3}, \cdots\cdots, \frac{1}{2^{n-1}}$ 級數有$n$項。……（ ）

❻ 等角多邊形之邊數越減少，其諸外角和越增加。……（ ）

❼ 內接於圓的等角五邊形爲正五邊形。……（ ）

❽ 定圓的外切正多邊形之邊數越多，其面積越小。……（ ）

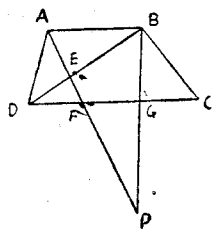
❾ 三角形的中線至少較長於三角形的一邊。……（ ）

❿ 菱形之對角線互相垂直平分。……（ ）

(2) $\triangle ABC$ 二外角平分線交於$D$，試證 $\angle BDC=\frac{1}{2}$（$\angle A$之外角）

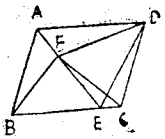
(3) 已知梯形 $ABCD$ 內，$DF=FG=GC$

試證： $AP:AE=FP:FE$




(4) 平行四邊形 $ABCD$ 的 $BC$ 邊上取一點 $E$，$AE$ 上任取一點 $F$，

則 $\triangle EFD=\triangle BFC$




(5) ❶ 解 $x^2+x=1.0956$

❷ 求 $(x^5+y^5)\div(x+y)$

❸ 化簡 $\dfrac{2^n\times(2^{n-1})^n}{2^{n-1}\times 2^{n-1}}\times\dfrac{1}{4^{-n}}$

❹ 解 $\begin{cases} x+y=1 \\ \dfrac{x}{y}+\dfrac{y}{x}=\dfrac{5}{2} \end{cases}$

❺ 解 $\dfrac{\sqrt{x}+3}{\sqrt{x}-2}=\dfrac{3\sqrt{x}-5}{3\sqrt{x}-13}$

(6) 牛肉和鷄卵裏含有的蛋白質及熱量如下表，若有鷄卵 100 公分，再添上幾公分的牛肉，才能得蛋白質40公分以上，而且熱量在350 *Cal.*(卡)以上。

| | 蛋白質 % | *Cal.* 每100公分 |
|---|---|---|
| 牛肉 | 20 | 140 |
| 鷄卵 | 13 | 150 |

(7) 有等差級數，第10項是 −1，第25項是4，試求下列各項：

(Ⅰ) 初項＝　　(Ⅱ) 公差＝　　(Ⅲ) 第100項＝

(Ⅳ) 第10項至第25項之和＝　　(Ⅴ) 第一項至第100項之和＝

(8) 某會每六天開會一次，這一次開會適逢星期日，問再過若干日，才能又逢星期日開會？

(9) 一晝夜快 4 分鐘之一不標準錶，某日正午與標準錶對準，則次日這錶的上午6時 3 分是標準錶的幾時幾分？

## 省立屏東師範學校

**(一)是非題**：是的在(　)內填(○)，非的填(×)，每題二分，錯的倒扣。

❶ $40\div 2\times 5=4$ ……(　)

❷ $2.0\dot{1}\dot{3}=\dfrac{2013-20}{990}$ ……(　)

❸ $\dfrac{6x-y}{2x}=3-y$ ……(　)

❹ $(x-y^0)(x^0+y)=x+xy-y-1$ ……(　)

❺ $\sqrt{2}+\sqrt{5}=\sqrt{7}$ ……(　)

❻ 若 $\sqrt{-1}=i$，則 $i^{15}=-i$ ……(　)

❼ 若 $A$, $B$ 兩角互爲餘角，且 $A>B$，則 $B<45°$ ……(　)

❽ 若 $A>B$，$C>D$，則 $(A-C)$ 必大於 $(B-D)$……（ ）
❾ 各邊等長的多角形就是正多角形……（ ）
❿ 兩圓面積之比等於其直徑……（ ）

**(二)填充題**：每題二分

❶ 1849的平方根是＿＿＿＿＿＿
❷ $(x^3+y^3+z^3-3xyz)(\quad\quad)=x^2+y^2+z^2-xy-xz-yz$
❸ $6x^2-23xy-4y^2$ 的因式是＿＿＿＿＿＿＿＿
❹ 方程式 $2x^2+x-2=0$ 的根是＿＿＿＿＿＿＿＿
❺ $A$, $B$ 兩數的等差中項是＿＿＿＿＿＿等比中項是＿＿＿＿＿＿
❻ 若 $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}$，則 $\frac{a^2+c^2+e^2}{b^2+d^2+f^2}=$＿＿＿＿＿＿
❼ 兩三角形中有兩角對應相等，這兩形便＿＿＿＿＿＿
❽ 若 $a, b, c$, 爲 $\triangle ABC$ 之三邊，且 $S=\frac{1}{2}(a+b+c)$，
則 $\triangle ABC$ 的面積等於＿＿＿＿＿＿
❾ 正八角形的每一內角的度數是＿＿＿＿＿＿
❿ 半徑爲 $R$ 的圓心角 $m°$ 所對弧的長等於＿＿＿＿＿＿

**(三)計算，證明及作圖題**：每題十分

❶ 以42，55，70除某數，皆可除盡，某數最少等於若干？
❷ 解方程式 $\frac{x+7}{3-x}+\frac{3x}{2}=x$
❸ 解方程式 $\sqrt{x+3}+\sqrt{x-5}=2$
❹ 求證：一三角形的三個角和另一三角形的三個角，各各相等，這兩個三角形便相似。
❺ 求證：三角形的面積等於底乘高的一半。
❻ 作圖：求作一正方形，使其面積等於一已知矩形。

## 省立屏東中學

*A.* **算術之部**：（每題10分）

❶ 有甲，乙，丙三種醬油，每公斤的售價分別是3元，3元8角，4元4角，現在想混合這三種醬油而作每公斤售價4元的醬油250公斤，問應當怎樣混合？
❷ 東倉貯米3000袋，西倉貯米2400袋，每日由兩倉各搬出70袋，問幾日後東倉的袋數是西倉袋數的3倍？

*B.* **代數幾何之部**：

I 是非（每題一分作錯倒扣）下列各題對的在括弧內寫「+」號，不對的寫「−」號。

❶ $(\sqrt{3}+\sqrt{4})\sqrt{5}=\sqrt{35}$……（ ）
❷ $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{pa+mc-ne}{pb+md-nf}$……（ ）

❸ $\frac{1}{(b-c)(b-a)}=-\frac{1}{(c-b)(a-b)}$ ……（ ）

❹ 設 $a>b$, $c>d$ 則 $ac>bd$ ……（ ）

❺ $12=7x-x^2$ 二根的乘積爲12 ……（ ）

❻ 以2代入 $x^2-3x+2$ 中，其值爲零，故 $x^2-3x+2$ 能被 $x+2$ 除盡。……（ ）

❼ 三角形三邊的垂直平分線必相交於一點，這點、叫做此三角形的內心。……（ ）

❽ 過弦中點的半徑必垂直於此弦。……（ ）

❾ 在圓周內距圓心較遠的弦較大。……（ ）

❿ 兩圓相切，則連心線必過切點。……（ ）

Ⅰ 選擇（每題一分）下列各題把你所選的正確答案的號碼填在括弧內。

❶ $(a-b)^3=a^3-3a^2b+3ab^2-b^3$ 是 ①方程式 ②恒等式 ③不定式（ ）

❷ 一量和他量的相乘積是常數時這兩個量互爲 ①正變 ②反變…（ ）

❸ 完全項的 $n$ 次多項式有 ① $n$項 ② $(n-1)$項 ③ $(n+1)$項…（ ）

❹ $\frac{x^{-1}y-1}{x^{-1}+y^{-1}}$ 的最簡式是 ① $\frac{1}{x+y}$ ② $\frac{x+y}{xy}$ ③ $\frac{xy}{x+y}$……（ ）

❺ 一點與圓心的連結線的長度等於此圓之半徑，則此點在 ①圓周上 ②圓外 ③圓內……（ ）

❻ 弓形角是銳角，則此弓形 ①大於半圓 ②等於半圓 ③小於半圓（ ）

❼ 三角形三邊設爲 $a, b, c$, 若 $a^2>b^2+c^2$，則 $a$ 邊對角是 ①鈍角 ②直角 ③銳角……（ ）

❽ 兩三角形若有二角對應相等則此兩形是 ①等積形 ②全等形 ③相似形……（ ）

❾ 三角形的一外角 ①大於其不相鄰的二內角的和 ②等於其不相鄰二內角的和 ③小於其不相鄰二內角的和。……（ ）

❿ 過一直線外的一點可以作出 ①一條 ②二條 ③無窮條平行於此直線的直線……（ ）

⓫ 一平行四邊形與一三角形是等底等高，則平行四邊形的面積 ①大於三角形的面積 ②等於三角形的面積 ③小於三角形的面積（ ）

⓬ 對角線互相垂直平分的四邊形叫做 ①平行四邊形 ②梯形 ③菱形……（ ）

⓭ 兩圓相交則可作 ①一條內公切線 ②二條內公切線 ③不能作內公切線……（ ）

⓮ 圓內接四邊形的對角的和 ①大於2∠$R$ ②等於2∠$R$ ③小於2∠$R$……（ ）

Ⅱ、填充（每題一分）解答填在括弧內

❶ $\sqrt{-12}\times\sqrt{-8}=$（ ）

❷ $log\ 1=$（ ）

❸ 設 $log\ 2=0.3010$, $log\ 3=0.4771$ 則 $log\ 6=$（ ）

❹ $25^{-\frac{1}{2}}=$（ ）

❺ 等比中項是（　　）中項與（　　）中項的比例中項

❻ $\frac{2x^2-x-1}{2x^2+5x+2}\times\frac{4x^2+x-14}{16x^2-49}=$（　　）

❼ $i^{123}=$（　　）

❽ $1, 1\frac{1}{2}, 2, 2\frac{1}{2}$……十項的和是（　　）

❾ $12m^5n^4$ 與 $16m^2n^5p^2$ 的 *L.C.M.* 是（　　）

❿ $\frac{b-c}{(a-b)(a-c)}+\frac{c-a}{(b-c)(b-a)}+\frac{a-b}{(c-a)(c-b)}=$（　　）

Ⅳ 計算（❶~❸每小題四分❹六分）

❶ 求下列各式之值：

（*a*）設 $\frac{x}{y}=\frac{3}{4}$ 求 $\frac{5x-3y}{7x+2y}$　　（*b*）$\frac{a^2+b^2}{a+bi}$

❷ 分解下列各式成因式：

（*a*）$(1-a^2)(1-b^2)-4ab=$　　（*b*）$x^3-7x-6=$

❸ 解下列方程式：

（*a*）$\begin{cases}x^2+xy+y^2=2a\\x^2-xy+y^2=2b\end{cases}$　　（*b*）$\frac{x}{x-2}-\frac{x+1}{x-1}=\frac{x-8}{x-6}-\frac{x-9}{x-7}$

❹ 兩地相距 120 里，甲、乙兩人各從一地同時起身相向而行，甲每日比乙多走 4 里，兩人相會的日數恰等於甲每日所行里數的一半，問二人每日各行幾里？

Ⅴ、問答：（每題八分）

❶ 於四邊形 *ABCD*, $AB\perp BC$, $CD\perp DA$, $AD>AB$ 則求證 $BC>CD$。

❷ 從圓外的一點 *P* 作圓的切線 *PA*（切點爲 *A*），與割線 *PBC*（與圓周之交點爲 *B*,*C*）求證 *PA* 爲 *PB*, *PC* 的比例中項。

## 省立屏東女子中學

**代　數**

一、分解下列各題的因數……（16%）

❶ $x^4-5x^2+4$　　❷ $x^4+x^2y^2+y^4$

❸ $2(x+y)^2-3(x+y)-5$　　❹ $8x^6+7x^3-1$

二、解下列各方程式……（14%）

❶ $\frac{1}{2}(3x+\frac{1}{2})-\frac{2}{3}(x+\frac{1}{3})=\frac{1}{6}$

❷ $\sqrt{1+x}-\sqrt{1-x}=1$

三、試解 $\begin{cases}2x^2-7xy+6y^2=0\cdots\cdots①\\x^2-3y^2+2y=3\cdots\cdots②\end{cases}$……10%

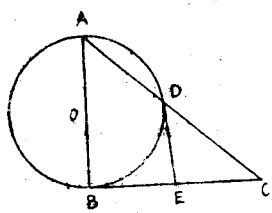
四、本金10000元，一年一期之複利率爲4%，問二年末之本利和共若干？……10%

**幾　何**

五、梯形的兩底長6 和4，一腰是10，此腰和下底的夾角是 30°，求面積。……10%

六、直線 $EF$ 平行於 $\square ABCD$ 之對角線 $AC$，交 $AB, BC$ 爲 $E, F$，求證 $\triangle ADE = \triangle CDF$……10%

七、設直角三角形 $ABC$ 之直角一邊 $AB$ 爲圓之直徑此圓與斜邊 $AC$ 相交於 $D$，求證在 $D$ 點上所作之切線必平分其他一邊 $BC$……15%




八、求作一直線平行於三角形的一邊，且分三角形面積成兩等分。……15%

## 省立屏東農業職業學校

**一 算術**（每題5分）

❶ $87 \div \{20 \times 0.4 + 7 \times [3\frac{3}{4} \times 2\frac{2}{5} \div (4.5 \div \overline{2-0.5})]\} + 7 =$

❷ 4時32分45秒÷3×2−2時1分50秒＝

❸ 有大小二數，其和爲11，其差爲9，求二數。

❹ 設甲每秒跑2公尺，乙每秒跑1.5公尺，今若乙先出發15秒後而甲追之，問何時何處可以追上？

**二 代數**（每題5分）

❺ 化簡 $\frac{a^3 b^4}{m^2-1} \times \frac{m+1}{a^2 b^3} =$

❻ 化簡 $\sqrt{8} + 3\sqrt{2} - \sqrt{18} + \sqrt{32} =$

❼ 分解 $x^5 - x^4 - 2x^3 + 2x^2 + 5x - 5$

❽ 分解 $3a^2 + 17a + 24$ 的因子。

❾ 解 $\begin{cases} 3(4x+7y) = 87 \\ 2(x+3y) = 22 \end{cases}$

❿ 解 $a^4 - 13a^2 + 36 = 0$

⓫ 用配方法解 $x^2 = 6x - 8$ 的方程式

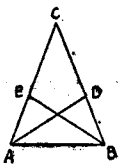
⓬ 求 $\sqrt{-36} \div \sqrt{-9} + \sqrt{-16} \times \sqrt{-4} =$？

⓭ 父年30歲，子年6歲，問幾年後父年爲子年分2倍？

⓮ 甲10日做成的事，乙須12日做成，與2人合做幾日可成？

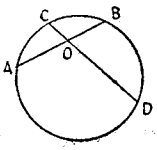
**三 幾何**（每題6分）

⓯ 如圖設 $AC = BC$，$AD$ 是 $\angle A$ 的平分線，$BE$ 是 $\angle B$ 的平分線，試證 $AD = BE$

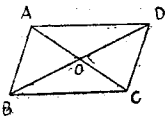


⑯ 已知△$ABC$內$AD$平分$\angle BAC$，求證$BD:DC=AB:AC$

⑰ $P$爲圓$O$外的一點，$PA$, $PB$爲圓的切線，求證$PA=PB$

⑱ 

如圖，知圓內二弦 $AB$, $CD$ 相交於$O$，求證
$AO\times OB=CO\times OD$

⑲ 

$AC$, $BD$ 爲平行四邊形的二對角線，求證
$AO=OC$, $BO=OD$

## 省立花蓮師範學校

❶ 證明 $\sec x-\tan x\cdot\sin x=\cos x$ 14%

❷ 簡化：14%

$$1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{5}}}}$$

❸ 解$\dfrac{x^2+x-2}{2-x}=\dfrac{4x^2+5x-6}{6-5x}$ 12%

❹ 已知一等差級數第三項爲7，第8項爲－18，求這級數首項至第八項之和。12%

❺ 一個長方形的長比寬多4尺，若長減少5尺，寬增加6尺，則面積增加3方尺，求這長方形的長和寬。12%

❻ 三角形三內角的平分線，必共過一點。12%

❼ 求作一三角形與已知五角形等積。12%

❽ 試證三角形二邊中點的聯線必與第三邊平行且等於第三邊的一半。12%

## 省立花蓮中學

(一)**是非法**：下列各題認爲對的在括弧中註「＋」號。不對的註「－」號。
〈應得分數＝1分×（對題數－$\frac{1}{2}$，錯題數）〉10%

❶ 臺灣省本島的面積是 35834 平方公里……（ ）

❷ $\dfrac{1}{6}>\dfrac{6}{25}$……（ ）

❸ 在正數中絕對值大在頁數中絕對值小者其值大……（ ）

❹ $a^2b^2-a^2-b^2+1=(a-1)(b-1)(a+1)(b+1)$……（ ）

❺ $\sqrt[3]{\dfrac{81}{625}}=\dfrac{9}{25}$……（ ）

⑥ 1方公里＝1000方公尺 ……（ ）

⑦ $2\sqrt{x}-3\sqrt{n^2}+5\sqrt{x^3}=10\sqrt{x^2}$ ……（ ）

⑧ 梯形的面積等於上下底的半和乘高……（ ）

⑨ 如$5\sqrt[3]{4}$中之5叫根數的係數而3叫根指數……（ ）

⑩ 過弦中點的半徑必垂直於此弦……（ ）

**(二)選擇法**：20%（在括弧內寫出你認爲是對的數字）

⑪ 某人脈博每分鐘跳55次半天共跳 ①39600次 ②33600次 ③79200次……（ ）

⑫ 圓內接四邊形的對角互爲 ①隣角 ①補角 ③餘角……（ ）

⑬ $a^3+b^3+c^3-3abc=$①$(a+b+c)(a^2+b^2+c^2-2ab-2bc-2ca)$ ②$(a-b-c)(a^2+b^2+c^2+ab+bc+ca)$ ③$(a+b+c)(a^2+b^2+c^2-ab-bc-ca)$（ ）

⑭ 過圓的半徑一端與半徑成垂直的線叫 ①截線 ②切線 ③割線…（ ）

⑮ $\sqrt{(-5)^2}$應等於 ①5 ②$-5\sqrt{-1}$ ③$5\sqrt{-1}$……（ ）

⑯ $\frac{x-y}{y-x}$應等於 ①1 ②$-1$ ③$-\frac{x-y}{x+y}$……（ ）

⑰ 聯三角形三邊中點成一新三角形則原形之外心是新三角形之 ①垂心 ②內心 ③重心……（ ）

⑱ 欲$4x^2+(1-m)x+25=0$有相等實根則$m$之值爲 ①25，23 ②21，$-19$ ③$-21$，19……（ ）

⑲ 酒精54公升加水6公升則混合液中所含酒精的百分比爲 ①54% ②60% ③90%……（ ）

⑳ 某數的平方與該數的$\frac{1}{3}$的乘積等於576則某數是 ①36 ②24 ③12……（ ）

**(三)填充法**：30%（在下面空白中填入適當的字句或數字及式）

㉑ $\sqrt{-2}\times\sqrt{-8}=$_____。

㉒ 多角形之邊數爲$n$時其內角之和爲_____。

㉓ $5a$，$25a^2$，$125a^3$……爲_____級數。

㉔ 直徑×_____＝圓周。

㉕ 經差一度，時差_____分；時差一小時，經差_____度。

㉖ 設一等腰三角形之頂角爲 100度，則其每底角爲_____度。

㉗ $(-1)^3(-1)(-1)(-1)^{10}(-1)^{40}=$_____。

㉘ 若兩角的二邊互相對應平行則此二角_____或_____。

㉙ 二元一次方程式的圖代表_____二元二次方程式的圖形代表_____。

㉚ $(x^4-y^4)\div(x+y)=$_____。

㉛ $25^\circ=$_____；$64^{5/6}=$_____；$3^{-3}=$_____。

㉜ $x+\frac{1}{x}=a+\frac{1}{a}$則 $x=$_____。

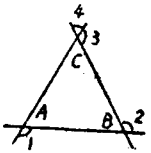
㉝ 若$(x-y):y=11:3$則$x:y=$_____

㉞ 設等腰直角三角形之一腰爲5則其斜邊爲_____其面積爲_____。

㊽ $356+\{100-[(64-48\times5)+88]\div28\}=$_____

**(四)計算或證** 40%

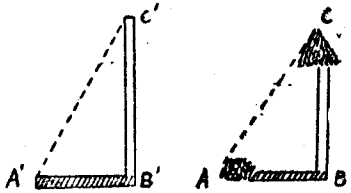
一、幾何

㊾ 

如圖設 $\angle A=65°$，$\angle C=50°$ 求 $\angle1$，$\angle2$，$\angle3$，$\angle4$ 的度數。

㊿ 試證明直角三角形弦上的中線，等於弦的一半。

(51) 如圖已知桿長 $B'C'=15$尺桿影 $A'B'=6$尺，樹影 $AB=24$尺，試求樹高 $BC$ 的長度又此種算法是用甚麼定理？




二、算術

(52) 某商人經營商業得資本的73%的利息，如若利息更多得251元，則資本與利息合計是2500元，求此商人資本多少？

(53) 上茶每公斤價48元，中茶每公斤價40元，下茶每公斤價24元，現在想混合三種茶得每公斤價30元的茶120公斤，問三種茶應各取多少？

(54) 設$\frac{1}{a}$，$\frac{1}{b}$，$\frac{1}{c}$成等差級數證明 $a:a-b=a+c:a-c$

(55) 設彈性球從30呎之高處落下，如每次反躍之高爲落下之高之2/3，則在靜止以前此球所經之距離若干？

(56) 甲乙兩數相乘的積是20，平方的和是41，求這兩數。

## 省立臺東師範學校

一、算 術：

❶ *a.* 化簡 $3-\cfrac{1}{2+\cfrac{2}{3-\cfrac{1}{3}}}$

*b.* 化簡 $30-\{[6+5\times(16-8\div4)]-50\}$

❷ *a.* 某數的4倍，除以5，減去60，再加上50得70，問原數是多少？

*b.* 把兵士排成一實心方陣，列數與每列人數相等還多11人，若把方陣多排1列，每列人數多加一人，則不足20人，問兵士有多少？

## 二、代數：

❸ 因式分解 $(x^2+x+1)(x^2+x+2)-12$

❹ 解下列方程式：

$a.\ 3x-4=x+2$

$b.\ \frac{x+1}{2}=\frac{x+2}{3}=\frac{x+3}{5}+2x-9$

❺ 解聯方程式：

$$\begin{cases}2x+3y=7\\4x-5y=3\end{cases}$$

❻ 有一分數，其分子與分母數字之差爲30，而其分數值等於$\frac{3}{5}$，求此分數。

❼ 把新臺幣80元分給張王二生，張生得的3倍比王生分得5倍多104元問張王二生各分新臺幣若干？

❽ 有一工程甲一人獨做10日可成，乙一人獨做15日可成，今甲乙二人合做3日後，再由乙一人繼續做完，問乙還要幾日？

❾ 有一矩形若長減3公尺寬增2公尺，則成正方形，而其面積比原面積少5平方公尺，求此矩形長及寬。

## 三、幾何：

❿ 連結梯形兩對角線中點的直線，等於梯形兩底的差之一半，試證之。

⓫ 如圖 $AB$, $CD$ 是同圓內的等弦，連結 $AC$, $AD$, $BC$ 各弦求證 $\triangle ABC$ 和 $\triangle ADC$ 是全等。

# 省立臺東中學

**甲、是非題：**（對的填(○)，錯的填(×)，每題一分，答錯倒扣）

❶ 月利8釐爲8%……（ ）

❷ 矩形的面積固定，其長與其闊成反比例。……（ ）

❸ 若 $b^2-4ac=0$ 則方程式 $ax^2+bx+c=0$ 的二根相等。……（ ）

❹ 負數的絕對值愈大，其值愈小。……（ ）

❺ $-\frac{1}{2}, \frac{1}{4}, -\frac{1}{8}$，……爲等差級數。……（ ）

❻ $\sqrt{-2}\cdot\sqrt{-8}=\sqrt{(-2)(-8)}=\sqrt{16}=4$ ……（ ）

❼ 經過平面上任意三點都可作圓。……（ ）

❽ 二直線若有二公共點相合，就可以完全疊合。……（ ）

❾ 各邊相等的多邊形，必定是正多邊形。……（ ）

❿ 兩三角形只要有兩角彼此各各相等，就是相似三角形。……（ ）

**乙、填充題**：（每題二分）

❶ 24，28，30，的 $G$, $C$, $M$, 爲（　　），$L$, $C$, $M$, 爲（　　）。

❷ $x^5-y^5=$（　　）（　　）。

❸ 若 $P_1:P_2=W_1:W_2$ 則 $P_1:W_1=$（　　）：（　　）

❹ 四邊形的（　　）角若互爲（　　）角，則四頂點共圓。

❺ 與一線段兩端等距離的諸點必在此線段的（　　）線上。

**丙、選擇題**：（每題二分）

❶ 一公升等於 ①一立方公分 ②一立方公寸 ③一立方公尺……（　）

❷ $\begin{cases}2x+3y=4\\4x+6y=13\end{cases}$ 之圖解是 ①二直線相交 ②二直線平行 ③二直線合而爲一。……（　）

❸ $a^0$等於 ① 0 ② 1 ③ $a$……（　）

❹ 三角形的重心是 ①三中線 ②三內分角線 ③三邊之垂直平分線的交點。……（　）

❺ 菱形的兩對角線互相 ①平分 ②垂直 ③平分且垂直。……（　）

**丁、計算**：證明，作圖題（每題十分）

❶ 甲出資本4000元經營商業，過四個月後，乙加入資本3000元，又過兩個月後，丙加入資本5000元，開業一年後獲利4080元，若按資本多少及投資時間長短來分配利益，問甲、乙、丙三人各應得多少？

❷ 求下列二式之結果：

$(a)$ $(x^3)^{2x}\cdot(x^{-2})^{3x}$　　$(b)$ $(x^{\frac{1}{2}}+y^{\frac{1}{2}})(x^{\frac{1}{2}}-y^{\frac{1}{2}})$

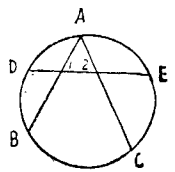
❸ 一直角三角形周圍長30丈，斜邊長13丈，問其餘二邊的長各多少？

❹ 解聯立方程式 $\begin{cases}\dfrac{a}{x}+\dfrac{b}{y}=1\\[2ex]\dfrac{b}{x}+\dfrac{a}{y}=1\end{cases}$

❺ 試證三角形三中線的和小於三角形的周長。

❻ 於一已知線段上，求作弓形使所含的弓形角等於一已知角。

❼ 如圖 $E$, $D$, 爲 $\overset{\frown}{AC}$, $\overset{\frown}{AB}$ 的中點，聯結 $DE$, 求證 $\angle 1=\angle 2$



## 79 省立馬公中學

❶ $32\div 8\times 4+56\div 14\times 2-36\div 12\times 3=$？

❺ 五元與十元鈔票共20張計165元，問五元與十元鈔票各幾張？（限用算術，用代數作者無分）

❸ 解：$2x^2+3x-2=0$ 求 $x$ 值

❶ 求4與16之等差，等比，調和各中項

❺ 解：$x^2+y^2x=13$　　求 $x$, $y$, 之值

$$x^3-2y^2=1$$

❻ 甲乙，共有30元，乙丙共有50元，又丙較甲之兩倍多7元，問甲乙丙各有幾元？

❼ 等腰三角形頂角至底邊之垂線過底邊之中點。

❽ 四邊形各邊中點之聯線爲平行四邊形。

❾ 切線和過切點之弦所成之角，可用弦和切線間之弧一半來度。

❿ 兩弦 $AB$, $CD$ 相交於 $E$，若 $CE=ED$, 求 $CE=$？（以上每題10分）

# 英語科解答

## 省立臺北工業專科學校

I (a) ❶ (spring) ❷ summer ❸ autumn ❹ winter
(b) ❶ (January) ❷ February ❸ March ❹ April
❺ May ❻ June ❼ July ❽ August
❾ September ❿ October ⓫ November ⓬ December
(c) ❶ (Sunday) ❷ Monday ❸ Tuesday ❹ Wednesday
❺ Thursday ❻ Friday ❼ Saturday

II ❶ day ❷ below ❸ much ❹ healthy ❺ hate
❻ thin ❼ dislikes ❽ humble ❾ dead ❿ under
❶ cell ❷ fare ❸ pail ❹ lessen ❺ flower
❻ sum ❼ due ❽ rite ❾ prey ❿ meet

III ❶ (I am) a student. ❷ (In a few years, he becomes) very rich.
❸ (They proved) what he had done was guilty.
❹ (The silk feels) smooth. ❺ (He got) accustomed to early rising.
❻ (You look) pale. ❼ (The meat smells) delicious.
❽ (Sugar tastes) sweet. ❾ (Things do not stay) for a moment.
❿ (The street boys go) out fishing.

IV ❶ 不要改 ❷ 不要改
❸ told 改爲 tell ❹ called 刪去
❺ 不要改 ❻ robbed 改爲 robbed me of
❼ the place 改爲 the place where ❽ 全文改爲 Where are you going?
❾ is it! 改爲 it is! ❿ lived before there 改爲 lived there before

V ❶ a. It is difficult to speak English.
b. It is healthy to rise early.
❷ a. How beautiful she is! b. How foolish he is!
❸ a. My father gave me a watch.
b. Our teacher told us an interesting story.
❹ A. a. Although he is a middle school student, he can speak English very well.
b. Although he is poor, he is always honest.
B. a. He is old, but he is strong.
b. What he says is all very well, but I have my own views.

## 省立臺北第一女子中學 / 省立臺北第二女子中學 / 省立板橋中學（女子組） 聯合招生

❶ ② ❷ ④ ❸ (○) ❹ ① ❺ ④

| | | | | |
|---|---|---|---|---|
| ❶ ③ | ❷ ② | ❸ ④ | ❹ ② | ❺ ② |
| ❻ (○) | ❼ (○) | ❽ ② | ❾ ③ | ❿ ③ |
| ⓫ ① | ⓬ ④ | ⓭ ③ | ⓮ ① | ⓯ (○) |
| ⓰ (○) | ⓱ ③ | ⓲ ② | ⓳ ② | ⓴ ① |
| ㉑ (○) | ㉒ ① | ㉓ ② | ㉔ ② | ㉕ ③ |
| ㉖ (○) | ㉗ ④ | ㉘ ③ | ㉙ ④ | ㉚ (○) |
| ㉛ ② | ㉜ ③ | ㉝ (○) | ㉞ ④ | ㉟ ④ |
| ㊱ ② | ㊲ ① | ㊳ ③ | ㊴ ② | ㊵ ② |
| ㊶ ③ | ㊷ ① | ㊸ ② | ㊹ ① | ㊺ ③ |
| ㊻ ③ | ㊼ (○) | ㊽ ④ | ㊾ ④ | ㊿ ① |
| ㊾ ② | ㊿ (○) | ㊿ (○) | ㊿ ③ | ㊿ ② |
| ㊿ ③ | ㊿ ③ | ㊿ ① | ㊿ ④ | ㊿ ② |
| ㊿ ① | ㊿ ③ | ㊿ (○) | ㊿ ② | ㊿ ② |
| ㊿ ④ | ㊿ ② | ㊿ ④ | ㊿ ④ | ㊿ ① |
| ㊿ ② | ㊿ ② | ㊿ (○) | ㊿ (○) | ㊿ ④ |
| ㊿ (○) | ㊿ ③ | ㊿ ③ | ㊿ ① | ㊿ ② |
| ㊿ ④ | ㊿ (○) | ㊿ ③ | ㊿ ④ | ㊿ ② |
| ㊿ ① | ㊿ ④ | ㊿ (○) | ㊿ (○) | ㊿ ① |
| ㊿ (○) | ㊿ ④ | ㊿ ④ | ㊿ (○) | ㊿ ② |
| ㊿ ③ | ㊿ ② | ㊿ ② | ㊿ ③ | ㊿ ② |
| ㊿ ② | ㊿ ① | ㊿ ④ | ㊿ ③ | ㊿ ① |
| ㊿ ② | ㊿ ② | ㊿ ① | ㊿ ③ | ㊿ ③ |
| ㊿ (○) | ㊿ ③ | ㊿ (○) | ㊿ ④ | ㊿ ④ |
| ㊿ ② | ㊿ ③ | ㊿ ② | ㊿ ④ | ㊿ ② |
| ㊿ ② | ㊿ ② | ㊿ ④ | ㊿ ② | ㊿ ① |
| ㊿ (○) | ㊿ ② | ㊿ (○) | ㊿ ② | ㊿ ③ |
| ㊿ (①) | ㊿ ② | ㊿ ④ | ㊿ ④ | ㊿ ③ |
| ㊿ ④ | ㊿ ② | ㊿ ③ | ㊿ ③ | ㊿ ① |
| ㊿ ③ | ㊿ ② | ㊿ ② | ㊿ ② | ㊿ ④ |
| ㊿ (○) | ㊿ ② | ㊿ ① | ㊿ ③ | ㊿ ② |

## 省立臺北商業職業學校

I ❶ between ❷ at ❸ out ❹ can speak ❺ much
❻ in ❼ by ❽ for ❾ on ❿ to
⓫ on ⓬ in ⓭ are ⓮ who ⓯ is
⓰ Not ⓱ no ⓲ Were ⓳ in ⓴ which

II ❷ knew ❸ had told ❹ have lived
❺ was sleeping ❻ was reading ❼ slept
❽ were eating ❾ was raining ❿ was waiting
⓫ is blowing ⓬ saw ⓭ studied
⓮ wrote ⓯ has been ⓰ read

⑰ has travelled ⑱ has worked ⑲ was
⑳ was writing ㉑ was going.

I ② She is not busy. ③ John did not go to Japan.
④ He does not have any money.
⑤ John does not shut the window.
⑥ This room is not large. ⑦ He does not live by himself.
⑧ She does not sing well. ⑨ She does not cut herself.
⑩ James can not speak French well.
⑪ She does not go to school every day.

IV ① How many desks have you in your house?
② In Taiwan some villages have no electric lights.
③ The other day, my uncle gave a handsome present to my youngest brother.
④ Secretary Dulles received a hearty welcome in Taiwan.
⑤ He shook hands with me.

## 臺北市私立靜修女子中學

I 1. short friend late come success dry lose danger forget same

2.

| | | | |
|---|---|---|---|
| gave | given | ran | run |
| sang | sung | drank | drunk |
| thanked | thanked | caught | caught |
| sat | sat | taught | taught |
| met | met | saw | seen |

3. boys countries houses flies roofs mice leaves sheep pianos teeth

4.

| | | | |
|---|---|---|---|
| smaller | smallest | larger | largest |
| happier | happiest | fatter | fattest |
| hotter | hottest | better | best |
| later | latest | more | most |
| more useless, | most useless | more important, | most important |

5. ① every 改爲 Every ② me 改爲 I
③ an 改爲 a ④ fond of 改爲 are fond of
⑤ beautiful 改爲 more beautiful
⑥ many 改爲 much ⑦ Whom 改爲 Who
⑧ they's 改爲 their ⑨ see 改爲 saw
⑩ one another 改爲 each other (註：兩人之間用 each other)

6. 消火夫 電梯 社會 手頸 教授
earth doctor hunger harvest sugar-cane

7. ① tennis ② love ③ Spring ④ drink ⑤ buys
⑥ Sunday ⑦ country ⑧ learn ⑨ discovered ⑩ shines

8. ① An apple is eaten by him. ② The man saw the child.

❸ The picture was painted by me. ❹ You open the window.
❺ The rat is killed by the cat.

## 臺北市私立開南商工職業學校

I ❶③ ❷② ❸④ ❹② ❺① ❻③ ❼④ ❽② ❾④ ❿③

II ❶ hand 改爲 hands ❷ before 改爲 after
❸ rise 改爲 rises ❹ by 改爲 on
❺ many 改爲 much ❻ any 改爲 some
❼ go 改爲 goes ❽ a 改爲 an
❾ am 改爲 are ❿ we 改爲 us

III ❶ What is your name? ❷ Where is my book?
❸ We can see two doors ❹ I stand behind the desk.
❺ They are going to America by plane.

IV ❶ Whose ❷ who ❸ are ❹ do

V ❶ The sun is much bigger than the moon.
❷ The second term of this year has begun.
❸ Every day I go to school at half past seven in the morning.
❹ Every day I go to Taipei from Keelung by train.

## 省立基隆中學

I ❶ Will John come to school to-morrow?
❷ Is February the second month of the year?
❸ Has he gone out of town?
❹ Did the boy leave his book at home?
❺ Did it take them a long time to finish the work?

II ❶ John does not study very hard.
❷ They do not need a fan in their room.
❸ She did not give him the book.
❹ We did not go to the movies last night.
❺ I did not find my copy-book.

III ❶ The tiger was killed by the hunter.
❷ We were told the story by the teacher.
❸ The report has just been finished by him.
❹ The new students are being examined by them now.
❺ The soldiers were being looked at by the boys.

IV ❶ arrived ❷ Which ❸ at ❹ in ❺ of
❻ were ❼ What ❽ a ❾ is ❿ is

V ❶ I afraid of 改爲 I am afraid of ❷ have 改爲 are
❸ I very glad 改爲 I am very glad
❹ 全文改爲 He does not go to-day.

❺ 全文改爲 Where are you going? I am going home.
❻ are 改爲 is ❼ do 改爲 will ❽ don't 改爲 can't
❾ are 改爲 is (註：請參照 P. 292 嘉義中學 I ❼解答)
❿ has written 改爲 wrote(註：last evening是過去時，所以動詞要用過去式)

VI ❶ I am older than my younger brother by two years.
❷ This motor-car is going to the station.
❸ I go to bed at ten o'clock every night.
❹ Lend me your bicycle, please.
❺ I found him sleeping on his seat.

## 省立基隆女子中學

A. ❶ dishes 盤 ❷ churches 教會 ❸ babies 嬰兒 ❹ pianos 鋼琴
❺ children 小孩 ❻ knives 小刀 ❼ mice 小老鼠
❽ volcanoes 火山 ❾ sheep 羊 ❿ teeth 齒

B. ❶ took taken ❷ stopped stopped ❸ put put ❹ stayed stayed
❺ studied studied ❻ laid laid ❼ broke broken
❽ ate eaten ❾ forgot forgotten ❿ swam swum

C. ❶ rooms 刪去 ❷ when 刪去 ❸ of 刪去
❹ do 刪去 ❺ happy 刪去 ❻ more 刪去
❼ me 刪去 ❽ many 刪去 ❾ would 刪去 ❿ who 刪去

D. ❶ a 改爲 the ❷ Were 改爲 Was ❸ but 改爲 help
❹ played 改爲 has been played ❺ is he 改爲 he is
❻ 全文改爲 You are standing on your own feet. (不受別人的扶助，獨立生活著。)
❼ The son very much 改爲 The son is very much
❽ needs 改爲 need ❾ to刪去 ❿ latter 改爲 later

E. ❶ of ❷ for ❸ in ❹ father ❺ all
❻ where ❼ go ❽ has ❾ our ❿ can

F. ❶ The dog bit the child. ❷ A thief has stolen the money.
❸ By whom this story was written?
❹ Our health will be hurt by too much eating.
❺ For the coming examination, my lessons are being reviewed by me.

G. ❶ He should fail in the entrance examination unless he makes his best.
❷ There is a river in front of my house.
❸ A man who cannot see is called a blindman.
❹ In summer, the temperature of the southern Taiwan, is as warm as that of the Philippine Islands.
❺ A few days ago, a steamer stroke against a rock.

H. ❶ As I get very tired, I can not work.
❷ As long as there is life, there is hope.

❸ As this matter is so difficult, I fear it may not be done well.
❹ If we were not healthy, we would not be able to enjoy true pleasure.
❺ Every Sunday afternoon, she would come and talk with me.

## 省立基隆水產職業學校

I ❶ 不久 ❷ 放棄 ❸ 許多 ❹ 一年中 ❺ 同意
❻ 相當於 ❼ 發見，了解 ❽ 尊敬 ❾ 進行，繼續 ❿ 當然
❶ 自由 ❷ 教育 ❸ 野遊 ❹ 誠實的 ❺ 科學
❻ 同伴 ❼ 震動 ❽ 音樂 ❾ 快樂 ❿ 小屋

II ❶ (bring) brought brought ❷ (begin) began begun
❸ (do) did done ❹ (put) put put
❺ (make) made made ❻ (lie) lay lain
❼ (talk) talked talked ❽ (come) came come
❾ (read) read read ❿ (go) went gone

III ❶ and 改爲 or ❷ much 改爲 many
❸ writing 改爲 write ❹ a 改爲 an
❺ give 改爲 gave ❻ whom 改爲 who, call 改爲 called
❼ have 改爲 had ❽ for feet 改爲 on foot
❾ old 改爲 older ❿ got up 改爲 get up

IV ❶ to go ❷ for ❸ hiding ❹ fought ❺ look
❻ from ❼ happy ❽ ready ❾ a moment ❿ glad

V ❶ I am seventeen years old, and live in Taipei.
❷ Because I want to be an expert in marine products industry.
❸ Yes, I do. Because we can get more new knowledge through English.
❹ I like natural history best.
❺ I have lived in Taiwan for more than sixteen years.

## 省立宜蘭中學

I in wintə ðə wéðə iz kould. in ðə nɔ:θ it snou. hwen ðə snou fɔ:ls, évriθiŋ luks hwait ənd bju:tiful.

II. a. father-land b. freedom c. honour d. Free World.
e. the Communist Bloc

III. ❶ She plays piano every day.
❷ He says, "I will buy a new book."
❸ He asked me to wait for him.
❹ He gave me a book, and I paid him ten dollars.
❺ I wish you will come to-morrow.

IV. ❶ a. adjective b. adverb ❷ a. adjective b. noun
❸ a. verb b. noun ❹ a. adjective b. noun

❺ a. adverb b. adjective

V. ❶ rose 改爲 rises（註：敘述「一般的眞理」須用現在式）
❷ eat 改爲 eaten（註：因係現在完成式）
❸ speaks 改爲 spoke（註：因係敘述 yesterday（即過去）的事情，所以須用過去式）
❹ Waited 改爲 Wait（註：命令文須用現在式）
❺ done 改爲 have done

VI ❶ I have been told the story.
❷ He (or she) left the first cup empty.
❸ I was asked a question by him.
❹ The dog bit the child.
❺ A history of France was studied by us.

## 省立蘭陽女子中學

I ❶ everything ❷ much ❸ at, in ❹ of
❺ curious ❻ bad ❼ whom
II ❶ harmful ❷ at ❸ on ❹ usually
❺ and ❻ murmur ❼ person ❽ who
III ❶ mistake 改爲 mistaken ❷ lot 改爲 lots
❸ thousands 改爲 thousand ❹ in 改爲 on
❺ likes 改爲 like ❻ the birds 改爲 the bird
❼ a 刪去 ❽ go 改爲 goes ❾ easy 改爲 easily
❿ going 改爲 gone ⓫ Can 改爲 May ⓬ have 改爲 has
⓭ foot 改爲 feet ⓮ fool 改爲 foolish ⓯ see 改爲 saw
IV ❶ caught, caught ❷ ate, eaten ❸ thought, thought
❹ gave, given ❺ wrote, written ❻ put, put
V ❶ My mother went to Taipei in company with my younger sister yesterday.
❷ Columbus discovered America.
❸ Since my father has died, I consider it my duty to take care of my younger brotners and sisters.
❹ He said he went to Keelung yesterday, but in fact he did not go there.
❺ As she was caught in the shower, so her coat became wet.
VI ❶ The cat caught the rats. ❷ My brother is seen by me.
❸ It can be seen by you. ❹ You were given a book by me.
❺ Columbus discovered America.
VII ❶ It is the San Francisco Bay Bridge.
❷ I have studied English for three years.
❸ General Chiang Kai-shek is the President of Chin .
❹ No, I have never seen a tiger.

❺ Of course, it is necessary to do so.

Ⅵ Both~and——conjunction John——proper noun
you——pronoun are——verb very——adverb
good——adjective students——noun

## 省立宜蘭農業職業學校

Ⅰ ❶ I am a Chinese. ❷ Taiwan is a part of China.
❸ Summer vacation begins at July. ❹ Today is Monday.
❺ A teacher teaches us English.

Ⅱ ❶ He sits on a chair. ❷ I have five fingers on my left hand.
❸ A boy who studies is a student.
❹ My English is not spoken language.
❺ She sings very well in the class.

Ⅲ ❶ No. ❷ Yes. ❸ No. ❹ Yes. ❺ No.
❻ No. ❼ Yes. ❽ Yes. ❾ No. ❿ No.

Ⅳ ❶ bugger 改爲 bigger ❷ visits 改爲 visit
❸ goes 改爲 went ❹ of 改爲 at
❺ become 改爲 became ❻ at 改爲 of
❼ had 改爲 had been ❽ wrote 改爲 write
❾ are 改爲 is ❿ have wanted 改爲 want

Ⅴ ❶ What ❷ who ❸ bought, belongs ❹ whose ❺ over
❻ returned, to ❼ said ❽ told ❾ give ❿ When

## 省立桃園中學

Ⅰ ❶ No, I don't think it is a friend of man.
❷ Because it carries disease. ❸ It can be seen in any house.
❹ It likes the dirtiest food. ❺ We should kill them at once.

Ⅱ ❶ speaks 改爲 speak. ❷ went 改爲 go.
❸ have 改爲 had ❹ I 改爲 me
❺ two-stories 改爲 two-storeyed. ❻ writing 改爲 written
❼ like he 改爲 like him. ❽ taken 改爲 taking
❾ make 改爲 made. ❿ eat 改爲 eating

Ⅲ ❶ 言語 ❷ 靜肅 ❸ 光榮 ❹ 經驗
❺ 理由 ❻ 蔬菜 ❼ 血液 ❽ 醫院
❾ 神經 ❿ 責任 ⓫ 甜的飲料 ⓬ 冷水浴
⓭ 思想的自由 ⓮ 有禮貌 ⓯ 暑假 ⓰ 一平方英哩
⓱ 太平洋 ⓲ 有才能的人 ⓳ 地球的表面 ⓴ 地下三千英[illegible]

Ⅳ ❶ To be diligent in study (is our duty.)
❷ (Let me) show you the way to the station.
❸ (He will not) go if it rains.

❶ (You must) not stir from the spot.
❺ (My father is too) old (to) do that work.
❻ (He is no longer) alive.
❼ (You are more) wise (than) him.
❽ (The more) I know him, (the more) I like him.
❾ I should remove the glass case (slowly and carefully)
❿ (What did you) do yesterday?

I

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ❶ | (sit) | sat | sat | ❷ | (put) | put | put |
| ❸ | (catch) | caught | caught | ❹ | (discover) | discovered | discovered |
| ❺ | (am) | was | been | ❻ | (have) | had | had |
| ❼ | (become) | became | become | ❽ | (hear) | heard | heard |
| ❾ | (sleep) | slept | slept | ❿ | (know) | knew | known |

## 省立桃園農業職業學校

A. ❶ (+) ❷ (−) ❸ (+) ❹ (−) ❺ (+)
❻ (+) ❼ (−) ❽ (+) ❾ (−) ❿ (−)

B. ❶ candles ❷ worms ❸ clock ❹ aunt
❺ animals ❻ behind ❼ tooth-brush ❽ supper
❾ post-office ❿ cotton

C. ❶ see (seen) ❷ me (I) ❸ not (do not) ❹ wise (wiser)
❺ us (we) ❻ is (are) ❼ Who (With whom), with 刪去
❽ he or you (you or he) ❾ live (to live) ❿ will 刪去, rain (rains)

D. ❶ has got ❷ rises ❸ went ❹ has rained
❺ have studied ❻ are ❼ rings ❽ looks
❾ had ❿ have been

## 省立新竹中學

I a. 人類不單滿足於支配地上和大洋，就轉向他的注意到征服空中。看到鳥類飛過他的頭上時，他也喜歡飛行。起初他造了輕氣球，但是它們隨風轉動，人類又需要自己能够控制的東西。於是他發明了飛機，現在他不再羨慕鳥類了。在他所希望的時間和地方，他會航行空中了。

b. 我們的祖國是在危難中。全國同胞們，武裝起來！武裝起來！除非全國民團結爲一體，起而自衛，否則已流出的所有寶貴的熱血都變爲無用的。自由中國的人民，你們願意死在蘇俄的屠殺刀劍下嗎？，否則起而防衛自己。當蘇俄踐踏你們父母妻子的遺骸在脚下，你們還願意旁觀嗎？否則起而防衛自己。

I ❶ Have you ever seen a tiger?
❷ My father used to go for fishing on Sundays.
❸ The more the better. ❹ He, as well as I, is a student.
❺ Though he has some faults, yet he is a greatest man.

❻ What are you looking for?
❼ Thoughts are expressed by means of words.
❽ I am not so tall as my father.
❾ It is three years since I left home.
❿ My eldest brother is five years older than I.

II ❶ on ❷ the ❸ which ❹ in ❺ after
❻ coming ❼ to ❽ did ❾ are ❿ or

IV ❶ The Asia 改爲 Asia ❷ best 改爲 the best
❸ 全文改爲 I was writing a letter when he came in.
❹ was 改爲 were ❺ to 刪去
❻ belong 改爲 belongs ❼ comes 改爲 come.
❽ 全文改爲 Every child loves his mother very much.
❾ or 改爲 nor ❿ busily 改爲 busy.

V ❶ mathematics ❷ Thursday ❸ struggle ❹ fertile
❺ fellowman ❻ respect ❼ hinder ❽ learning
❾ sudden ❿ society

VI ❶ Why you come to this school?
❷ October 10th is the Anniversary of China.
❸ There are no girl students in our school.
❹ We could not go because of raining.
❺ Will you go with me for swimming?

## 省立新竹女子中學

I A. ❶ 看顧 ❷ 準備戰鬪 ❸ 順便 ❹ 許多
❺ 把握 ❻ 在…場合 ❼ 找尋 ❽ 脫離…
❾ 實行，貫徹 ❿ 爲…起見 ⓫ 自由 ⓬ 廣告
⓭ 漂亮的 ⓮ 過勞 ⓯ 國外貿易商人 ⓰ 畢業
⓱ 獨立的 ⓲ 廢物，垃圾 ⓳ 正規的 ⓴ 招待

B. ❶ has planted 改爲 planted. ❷ interested 改爲 interesting
❸ is 改爲 are ❹ work 改爲 works, can 改爲 may
❺ wrote 改爲 write ❻ hide 改爲 hid
❼ 兩個 a 都改爲 an ❽ Anybody 改爲 Somebody.
❾ are 改爲 were ❿ who 刪去

C. ❶ from ❷ unless ❸ has ❹ are ❺ in
❻ have ❼ to ❽ the characters ❾ on ❿ since

D. ❶ 在田野上空旋盤後那銀色的船，駛向南方泰國而去。孩子們注視直到它沒入雲裏爲止。
❷ 我正在計劃和朋友們漫遊日月潭，因我來到這個寶島以來，還沒有去過
❸ 早晨雨暫時停了下來，但是不久又開始下雨，所以我整天被迫留在家裏。

❹ 除非全國民團結爲一人，起而自衛，否則已流出的所有寶貴的熱血都是無用的。
❺ 你不要由於考中了入學試驗而自驕，也不要由於考不中而失望。

E. ❶ He says, " I will buy a new book."
❷ If I were you I would help her.
❸ Everyday she plays piano.
❹ I have already graduated from the junior middle school.
❺ At this news, she left instantly.

F. ❶ Yes, it is difficult to study English.
❷ To-day is the 25th, July. (回答考試的日期)
❸ We should say, " Don't mention it ! "
❹ I will make our country a modern one.
❺ I like English best in the junior middle school.

## 省立新竹工業職業學校

I ❶ 工人 ❷ 鐵 ❸ 發動機 ❹ 蒸氣 ❺ 精力
❻ 物理 ❼ 輪船 ❽ 汽車 ❾ 化學 ❿ 電的

I ❶ August ❷ Wednesday ❸ examination ❹ factory
❺ climate ❻ telephone ❼ railway ❽ manufacture
❾ aeroplane ❿ oxygen

II ❶ love ❷ for ❸ not ❹ in ❺ difficult

IV ❶ grown ❷ in ❸ ever ❹ difficult ❺ seen

V ❶ knew, known ❷ throw, thrown ❸ lie, lay
❹ bring, brought ❺ put, put

VI ❶ do 改爲 does (註：因主語是 He)
❷ yesterday is 改爲 yesterday was ❸ your 改爲 yours
❹ asleep 改爲 sleep (註：asleep 是副詞，sleep 是動詞，用動詞才對。)
❺ understand 改爲 to understand, words 改爲 word

VII ❶ I am answering the questions in the examination paper.
❷ Yes, I do. ❸ No, he does'nt.
❹ I was preparing for this examination yesterday.
❺ It took me four hours.
❶ You need not go to school on Sunday.
❷ The city of Taipei is greater than that of Taichung.
❸ Your hair is plenty long enough.
❹ Either will do.
❺ Neither he nor she is mistaken.

## 省立新竹商業職業學校

I 當一個少年或少女離開學校初次擔當職業時，主人或主婦立刻問道：「你有沒

有好的品性嗎？」好的品性是每個人在一生中最需要的，而且要賺錢生活的人，都應該極力注意避免壞的習慣和壞的朋友，因爲這些，只會將人帶壞。

I ❶ You are only allowed to write either with fountain-pen or pencil on the examination paper.
❷ A table is made of wood.
❸ According to the Central Daily News (註：中央日報) to-day, it is said that there was a great fire in Taipei last night.
❹ He will arrive at Hongkong at 8 o'clock tomorrow morning.
❺ Most people are afraid of death.

II ❶ have ❷ and ❸ much ❹ on ❺ well
❻ is ❼ now ❽ most ❾ in ❿ In

IV ❶ whose 改爲 who ❷ write 改爲 written
❸ their 改爲 his ❹ Who 改爲 Whom
❺ The bird sing 改爲 The bird which sing.
❻ wound 改爲 wounded ❼ me 改爲 I
❽ are run 改爲 have run ❾ your 改爲 yours
❿ Does 改爲 Did

V ❶ action ❷ poverty ❸ motion ❹ belief ❺ difficulty
❻ bravery ❼ gold ❽ combination ❾ failure ❿ choice

VI ❶ experience ❷ life ❸ hero ❹ injury
❺ believe ❻ news-paper ❼ success
❽ memory ❾ railway ❿ invitation

## 省立苗栗中學

I ❶ ceiling ❷ potato ❸ skyscraper ❹ socks
❺ shirt ❻ bomb ❼ candy ❽ piano
❾ handkerchief ❿ bicycle ⓫ 敵人 ⓬ 菠菱菜
⓭ (足球等的)裁判員 ⓮ 子宮 ⓯ 被單或褥單 ⓰ 毛巾
⓱ 象 ⓲ 咽喉 ⓳ 票 ⓴ 月台

II ❶ 早睡早起。 ❷ 實用比裝飾更有用。
❸ 青蛙越跳，孩子們越投石頭。 ❹ 你給我十元錢，我找給你一角五分錢。
❺ 零吃是一種壞習慣。

III ❶ We say, "Good-by" ❷ I have ten fingers.
❸ I am looking for my knife ❹ He is my uncle
❺ Yes, I do sometimes.

IV ❶ As soon as my mother left home, a thief came into my bed room.
❷ My elder brother attended the meeting instead of my father.
❸ Owing to the bad weather, the start of the aeroplane has postponed.
❹ According to the news-paper, it is said that he has died.
❺ He called on me yesterday and asked for some money.

Ⅴ ❶ to drink ❷ playing basket-ball ❸ does ❹ at
❺ are ❻ an ❼ than ❽ note-book ❾ will be ❿ or

Ⅵ ❶ running 改爲 are running.
❷ do 改爲 does; his ability 改爲 his own obility.
❸ are 改爲 is (註：One of these girls 是單數) ❹ a 改爲 an
❺ is 改爲 am (註：who 是主語 I 的關係代名詞，所以述部的動詞要和主語符合) ❻ to 刪去 ❼ not 改爲 did not ❽ begin 改爲 begun
❾ done 改爲 did ❿ Bird fly 改爲 The bird flies

Ⅶ A. ❶ A cock is seen by me. ❷ I was told a story by him.
❸ Two pens are bought me by Mary.
B. ❶ A dog kills a cat. ❷ The teacher punished him.
C. ❶ Has he three brothers? ❷ Do they like to play tennis?
D. ❶ He is tired and lies down to rest.
❷ Spring coming, the day becomes long.
❸ Being sick, he is absent.

## 省立苗栗農業職業學校

Ⅰ ❶ 道德 ❷ 照相或像片 ❸ 成功 ❹ 勝利 ❺ 犧牲
❻ 雜誌 ❼ 汽車 ❽ 教育 ❾ 醫院 ❿ 作文

Ⅰ ❶ thought, thought ❷ swam, swum ❸ gave, given
❹ flew, flown ❺ spoke, spoken

Ⅰ ❶ sweet ❷ I ❸ Who ❹ easily ❺ Which

Ⅳ ❶ A book is read by me. ❷ An apple has been eaten by me.
❸ A letter was written by him.
❹ We are told a story by our teacher.
❺ She will write a letter.

Ⅴ ❶ an ❷ a ❸ any ❹ on ❺ at, in
❻ of ❼ for ❽ on ❾ in ❿ and

Ⅳ ❶ They are spring, summer, autumn and winter.
❷ There are seven persons in my family.
❸ Yes, I do. ❹ It is an ancient nation.
❺ I think that education is a good thing.

## 省立臺中第一中學

Ⅰ ❶ 他們在送別朋友。 ❷ 我很注意選擇我所需要的東西。
❸ 遊戲的孩子們非常吵鬧。 ❹ 爲獲得獎品他認眞工作。
❺ 有一個使者從很遠的都市來了。
❻ To obey one's parents is the duty of a child.
(或 A child's duty is to obey his parents.)

❸ The author of this book is not well known.
❽ There are usually white clouds in the sky, in the afternoon of hot summer days.
❾ A good student should have a healthy body.
❿ He worries himself about the examination.

I ❶ ugly ❷ careless ❸ kind ❹ life ❺ same
❻ dear ❼ virtue ❽ refuse ❾ present ❿ expel

II ❶ are ❷ at ❸ speaks ❹ Do ❺ at
❻ on ❼ because ❽ shall ❾ for ❿ who

IV ❶ one another 改爲 each other. ❷ went 改爲 will go.
❸ think 改爲 thinking ❹ ran 改爲 run ❺ was 改爲 I were

V ❶ He studies so hard that he may pass the examination.
❷ My circumstances are quite different from yours.
❸ Do you either wish for happiness or wealth?
❹ In front of his house, there is a pond.
❺ As it was Sunday, the bus was full of people.
❻ My mother told me again and again that I must not go to swim by myself because of danger.
❼ Lately my elder sister has been interested in playing piano.
❽ That question is too difficult for me to answer.
❾ The oral examination was carried on, the students answering one by one.
❿ I gave him some cake instead of money.

## 省立臺中第二中學

A. a. ❶ 究竟，結局 ❷ 市民 ❸ 後來 ❹ 至少
❺ 香煙 ❻ 切成碎片 ❼ 警察 ❽ 人力車
❾ 電車 ❿ 決不……

b. ❶ music ❷ hero ❸ class-mate ❹ news
❺ spear ❻ seashore ❼ iron ❽ punish
❾ pleasure ❿ enemy

B. ❶ at ❷ on ❸ as, as ❹ with ❺ that
❻ till ❼ but ❽ with ❾ of ❿ In

C. 很久以前有一個皇帝，他很喜歡新衣服，於是將所有的錢財花在衣服上面。他毫不注意兵卒和國家的事情。對打獵或射擊也全然沒有興趣。全心注意於顯他的新衣服。每天每小時都穿着不同的衣服。

D. ❶ Either you or I am to be blamed.
❷ My elder brother shall be able to pass the entrance examination of the Taiwan University.
❸ I like to go to seashore in summer.

❹ Most children are afraid of thunder.
❺ Whose watch is this?

E. ❶ We are taught by her.
❷ The window was broken by you.
❸ A story will be told by me.
❹ A letter is being written by him.
❺ The man has been laughed at by them.

## 省立臺中女子中學

I. ❶ take ❷ saw ❸ will come ❹ goes
❺ our ❻ are ❼ more beautiful
❽ well ❾ by ❿ at

I. ❶ No, I have never been to America.
❷ I have studied Chinese for nine years in China.
❸ I am living in Taichung now.
❹ I like the city of Taichung best.
❺ I came to England with my father.
❻ Yes, I am very busy to-day.
❼ Yes, I will be here to-morrow.
❽ Yes, I can speak English a little.
❾ He is looking at his younger sister.
❿ There are fifty students in the room.

I. ❶ Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday.
❷ January, February, March, April, May, June, July, August, September, October, November, December.
❸ spring, summer, autumn, winter
❹ ten, eleven, twelve, thirteen, fourteen, fifteen, sixteen, seventeen, eighteen, nineteen, twenty, twenty-one, twenty-two.

Ⅳ. 中國必須現代化，西洋科學不是英國科學，或法國科學，或德國科學。只有一個現代科學而已。要使中國採用西洋科學，而成爲一個現代國家的人，才是最愛中國的人。

## 省立臺中農業職業學校

I ❶ (×) ❷ (×) ❸ (○) ❹ (×) ❺ (○) ❻ (○) ❼ (×)
❽ (×) ❾ (○) ❿ (○) ⓫ (×) ⓬ (×) ⓭ (○) ⓮ (○)
⓯ (○) ⓰ (○) ⓱ (○) ⓲ (○) ⓳ (×) ⓴ (○)

I ❶ met ❷ well ❸ much ❹ on ❺ singing
I ❶ to ❷ kinds ❸ be ❹ severely ❺ too
❻ made ❼ the ❽ at ❾ on ❿ are

Ⅳ ❶ saw, seen ❷ came, come ❸ carried, carried
❹ caught, caught ❺ took, taken

Ⅴ ❶ I am a student. ❷ I learn English every day.
❸ A crow is a black bird. ❹ The sun shines.
❺ I can see this word.

Ⅵ ❶ I have ten fingers.
❷ They are spring, summer, autumn, and winter.
❸ We say, "How do you do, Mr. A?"
❹ No, I can't. ❺ A hare does.

## 省立臺中高級工業職業學校

Ⅰ ❶ friend ❷ beauty ❸ weight ❹ habit
❺ neighbour ❻ sixty minutes ❼ forget
❽ practice ❾ Taiwan (or Formosa) ❿ president

Ⅱ ❶ 六月 ❷ 尊敬 ❸ 工廠 ❹ 脚踏車 ❺ 雨傘
❻ 手帕 ❼ 科學 ❽ 牡牛 ❾ 中華民國 ❿ 美國

Ⅲ ❶ Don't 改爲 Doesn't ❷ go 改爲 goes
❸ boy 改爲 boys ❹ many 改爲 much
❺ me 改爲 I ❻ broken 改爲 is broken
❼ Whom 改爲 Who ❽ from 改爲 of
❾ a 改爲 an ❿ who 改爲 whom

Ⅳ ❶ He studies hard in order that he may pass the entrance examination.
❷ My mother has been to Taipei once before.
❸ He talks as if he knew everything.
❹ To visit him we started at 3 o'clock in the afternoon.
❺ Is he at home ?

Ⅴ ❶ I am sixteen years old. ❷ I was born in Taichung.
❸ I generally go fishing on Sundays.
❹ Robinson Crusoe. Arabian Nights.
❺ I get up at 6 in the morning and go to bed at 10 in the evening.

## 省立臺中商業職業學校

Ⅰ ❶ library ❷ earthquake ❸ science ❹ business
❺ summer vacation. ❻ Free China ❼ victory
❽ water-melon ❾ bank ❿ at once ⓫ 讚美
⓬ 犧牲 ⓭ 正義 ⓮ 廣告 ⓯ 生日 ⓰ 互助
⓱ 恐怕 ⓲ 代替 ⓳ 立即 ⓴ 不再

Ⅱ ❶ from 改爲 in ❷ fail 改爲 succeed ❸ Who 改爲 Whom
❹ had 刪去 (註：因 last night 是過去時，所以動詞用過去式)
❺ He or you 改爲 You or he (註：敘述二個以上的代名詞時，倘若係單

數，須以第二人稱，第三人稱，第一人稱之順序並列。）

❻ is 改爲 are（註：you and I 是複數）❼ me 改爲 I ❽ are 改爲 is
❾ come 改爲 comes ❿ am 改爲 were（註：因係假定法過去時）

Ⅱ ❶ Does he go to school every day?
❷ May he catch the train? ❸ Are there many kinds of soil?
❹ Can he swim quickly? ❺ Is she writing a letter?

Ⅲ ❶ of, by ❷ at, in ❸ on, of ❹ on, in ❺ at
❻ to ❼ by ❽ on ❾ with ❿ by
⓫ with ⓬ from, to, is, an, on.

Ⅳ ❶ Which is larger, the sun or the moon?
❷ There are four seasons in a year; spring, summer, autumn and winter
❸ I believe that the earth is round.
❹ My father returned the day before yesterday.
❺ What a fine weather it is!

## 省立大甲中學

Ⅰ ❶ 健康 ❷ 經驗 ❸ 有禮儀的 ❹ 火車 ❺ 朋友
❻ teacher ❼ beautiful ❽ post-office ❾ July ❿ class-room

Ⅰ ❶ of ❷ and ❸ is ❹ at ❺ of
❻ will ❼ than ❽ but ❾ which ❿ the

Ⅱ ❶ was 改爲 is ❷ some 改爲 any ❸ on 改爲 above
❹ a old man 改爲 old ❺ whom 改爲 who

Ⅲ ❶ I am seventeen years old.
❷ They are spring, summer, autumn and winter.
❸ There are five persons in my family.
❹ I like English best.
❺ I have studied English for three years.

Ⅳ ❶ His lessons have been learned by him.
❷ He gave me a watch.
❸ This work shall be finished tomorrow by me.
❹ My friend writes a letter.
❺ Our exercise books are corrected by our teacher.

Ⅴ ❶ He is not only clever, but also diligent.
❷ I am fond of playing basket ball.
❸ The sun is larger than the moon.
❹ The hen takes care of little chikens.
❺ Read this story, please. It is very interesting.

Ⅵ ❶ 我們必須愛我們的國家。 ❷ 現在我一刻的空閒都沒有。
❸ 十月十日是中華民國的誕辰。
❹ 馬利和她的兄弟常常在一起讀書和遊玩。

❺ 現在我們必須做的是和共產主義及蘇俄打仗。

Ⅵ ❶ (−) ❷ (+) ❸ (+) ❹ (−) ❺ (+)

## 省立彰化中學

Ⅰ. ❶ shine 改爲 shines, (註：主語係單數的名詞)
❷ he 改爲 him, I 改爲 me, (註：因係 saw 的目的格)
❸ visit 改爲 has visited (註：敘述現在動作的完成須用現在完成式)
❹ 全文改爲 Running across the street, I saw a cent.
❺ Who 改爲 Whom (註：因係目的格)
❻ have written 改爲 wrote (註：因係敘述過去 (yesterday) 的動作)
❼ the tallest 改爲 taller (註：兩人之間的比較用比較級)
❽ begun 改爲 began (註：敘述過去的動作用過去式)
❾ was 改爲 is (註：「一般的眞理」須用現在式)
❿ to 刪去 (註：had better 下面的動詞不要用「to」)

Ⅱ. ❶ heroes ❷ babies ❸ wives ❹ students
❺ valleys ❻ mice ❼ deer ❽ oxen
❾ women ❿ geese

Ⅲ. ❶ breakfast ❷ cheerful ❸ regular ❹ theatre
❺ submarine ❻ idle ❼ library ❽ phonograph
❾ statesman ❿ charcoal

Ⅳ A. ❶ The cup was broken by the servant.
❷ He was laughed at by all his friends.
❸ They were told a story by John.

B. ❶ The wind broke off the roof of the house.
❷ The flood destroyed the crops.
❸ The enemy seized the ship.

## 省立彰化女子中學

Ⅰ. ❶ accept ❷ business ❸ card ❹ gate ❺ honour

Ⅱ. ❻ ④ ❼ ① ❽ ② ❾ ③④ ❿ ①

Ⅲ. ⓫ ② ⓬ ①③ ⓭ ③ ⓮ ② ⓯ ④

Ⅳ. ⓰ ④ ⓱ ⑤ ⓲ ⑧ ⓳ ② ⓴ ⑩

Ⅴ. ㉑ ③⑨ ㉒ ⑦ ㉓ ⑧② ㉔ ⑥ ㉕ ①

Ⅵ. ㉖ (3. 5. 2. 1. 4. 6.) ㉗ (4. 3. 5. 6. 2. 1.)
㉘ (2. 5. 3. 6. 4. 1.) ㉙ (2. 4. 3. 1. 6. 5. 7.)
㉚ (5. 4. 2. 6. 1. 7. 8. 9. 3.)

Ⅶ. ㉛ ④ ㉜ ③ ㉝ ① ㉞ ② ㉟ ②

Ⅷ ㊱ Will you come to-morrow?
㊲ I am very tired.

⑧ I will buy a new book.
⑨ I have studied English for three years.
⑩ Will you go with me for swimming?

Ⅱ ❶ Look at your clothes. It is stained by ink.
❷ We see with our eyes.
❸ What is that dictionary which he is seeing?
❹ He did not come to school yesterday because of his illness.
❺ You may come here to play ball, but you should not talk loudly.

## 省立彰化工業職業學校

Ⅰ ❶ It is May. ❷ We call him a teacher.
❸ I am sixteen years old. ❹ I have read ten English books.
❺ I come to school at 7 o'clock in the morning.

Ⅱ ❶ are ❷ on ❸ at ❹ Has ❺ did
Ⅱ ❶ lives ❷ is ❸ me ❹ has ❺ writing
Ⅳ ❶ a 改爲 an ❷ am 改爲 are ❸ write 改爲 writes
❹ am 改爲 are ❺ playing 改爲 play

Ⅴ ❶ Spring is the first season of the year.
❷ I walk to school every day.
❸ Do you love your country?
❹ Once a dog had a piece of meat.
❺ They are good to eat.

Ⅵ 雙十節是國慶日，就是中華民國的誕生日。在雙十節那天，所有的學校放假，所有的商店關門休業。每戶都有懸掛國旗。

## 省立彰化商業職業學校

Ⅰ ❶ 火車 ❷ 廣告 ❸ 招待 ❹ 照相機 ❺ 辭典
❻ 一俟…就… ❼ 一些 ❽ 穿着 ❾ 屬於 ❿ 由…而成

Ⅱ ❶ 工作時工作，遊玩時遊玩。 ❷ 足球比賽時，各隊有十一個人。
❸ 你書讀的越多，知道的越多。
❹ 小艇在人們使用汽艇的幾千年以前就已經被人使用了。
❺ 夏季是一年中最熱的季節。我們不喜歡它。

Ⅲ ❶ Who is she? ❷ They are just reading Chinese.
❸ Sunday is the first day of the week.
❹ The saucer is between the knife and the fork.
❺ A quarter is one forth of an hour.

Ⅳ ❶ read, read ❷ knew, known ❸ went, gone
❹ did, done ❺ made, made ❻ ate, eaten
❼ stood, stood ❽ saw, seen ❾ taught, taught ❿ took, taken

V ❶ united states of america 改爲 United States of America.
(註：固有名詞須用 capital letter 即大寫字母)
❷ loves 改爲 love ❸ to 改爲 at
❹ in 改爲 with (註：使用器具工作須用 with)
❺ teeth 改爲 tooth (註：因係單數)
VI ❶ low ❷ short ❸ ugly ❹ out ❺ there

## 省立員林中學

I 參看 P. 292 省立嘉義女子中學Ⅱ (1) 解答
II ❶ were ❷ or ❸ who ❹ will ❺ in
❻ since ❼ from ❽ that ❾ do ❿ were
III ❶ buy 改爲 to buy ❷ a 刪去
❸ I and you 改爲 you and I (參看 P. 286 臺中商業答案Ⅱ. ❺解答)
❹ eat 改爲 have eaten ❺ to 刪去
❻ her 改爲 she (註：用主格 she 才對)
❼ many 改爲 much (註：表示量的多少須用 much)
❽ are 改爲 is ❾ could spoke 改爲 can speak ❿ other 刪去
IV ❶ (+) ❷ (−) ❸ (−) ❹ (+) ❺ (+)
❻ (−) ❼ (−) ❽ (+) ❾ (+) ❿ (−)
V ❶ worse ❷ private ❸ rich ❹ hard ❺ cool
❻ long ❼ square ❽ peace ❾ beautiful ❿ difficult
VI ❶ He is liked by them. ❷ He will teach me.
❸ English is being written by us. ❹ A bird has been canght by Mary.
❺ Today we see many signs on the road.

## 省立員林農業職業學校

I ❶ 要使中國成爲一個現代國家的人才是最愛中國的人。
❷ 今天你能够做的事情，不要延遲到明天。
❸ 我們是爲生存而吃，不是爲吃而生存。
II ❶ happiness ❷ silence ❸ idleness ❹ diligence
❺ freedom ❻ poverty ❼ truth ❽ wisdom
❾ height ❿ honesty
III ❶ kept, kept ❷ did, done ❸ went, gone ❹ had, had
❺ taught, taught
IV ❶ the Double Ten Festival ❷ policeman ❸ animal
❹ parents ❺ grandfather ❻ president ❼ speaking
❽ history ❾ mother ❿ examination
V ❶ our ❷ my ❸ an ❹ three ❺ back
VI ❶ There are twelve months in a year.

❷ There are six persons in my family.
❸ I like English better.
❹ Because China is my fatherland.
❺ I am sixteen years old.

## 省立斗六中學

A. ❶ dentist ❷ bicycle ❸ Soviet Russia ❹ enemy
❺ bandit ❻ thunder ❼ orange ❽ train
❾ mosquito ❿ fly ⓫ fan ⓬ breakfast
⓭ postman ⓮ attend ⓯ park ⓰ banana.
⓱ pineapple ⓲ bus ⓳ history ⓴ geography
㉑ education ㉒ dictionary ㉓ aeroplane ㉔ bank
㉕ vegetable ㉖ 錯誤 ㉗ 共產主義 ㉘ 尾 ㉙ 車輪
㉚ 肉叉 ㉛ 鄉村 ㉜ 廚房 ㉝ 自由 ㉞ 象
㉟ 油 ㊱ 流行 ㊲ 機會 ㊳ 條件 ㊴ 注意
㊵ 靜肅 ㊶ 教授 ㊷ 問題 ㊸ 肘 ㊹ 化學
㊺ 大洋 ㊻ 釣魚者 ㊼ 身體的（或物理學的） ㊽ 幽默
㊾ 醫院 ㊿ 有智力的

B. ❶ × ❷ × ❸ × ❹ ○ ❺ ○

C. ❶ of ❷ for ❸ Have ❹ is ❺ study
❻ speaking ❼ has ❽ bites ❾ wrote ❿ studied
⓫ are ⓬ leader ⓭ It ⓮ take ⓯ of
⓰ with ⓱ at ⓲ mild ⓳ loyal to ⓴ as
㉑ than ㉒ so ㉓ cakes ㉔ enough ㉕ discovered
㉖ while ㉗ lay ㉘ very ㉙ Have ㉚ has
㉛ in ㉜ of ㉝ in ㉞ of ㉟ at
㊱ at ㊲ in ㊳ have ㊴ was ㊵ ago
㊶ where ㊷ nothing ㊸ picked ㊹ Put ㊺ wood
㊻ who ㊼ safe ㊽ playing ㊾ seen ㊿ went

D. ❶ 革命尚未成功，同志仍須努力。
❷ 兩點間的最短距離是直線。
❸ 轉動之石不生苔（喻無恒心者無所得）

## 省立嘉義中學

I ❶ Young man should avoid to do any wrong doings.
❷ Once when I fell sick, my mother sent for a doctor.
❸ To know is one thing, to practise is another.
❹ The army crossed over the river by boat.
❺ As to that matter, I have never heard of it.
❻ All the three brothers love one another.

❼ As soon as I finish my exercise, I will go with you.
❽ He called on me and asked for money.
❾ To reach to the Moon World is a great difficulty.
❿ Her appearance is much the same with that of my younger sister.

I. ❶ I 改爲 me（註：因 I 係目的格）
❷ have met 改爲 met（註：有過去時的副詞 "yesterday" 所以要用過去式。）
❸ 全文改爲 Though I came, yet he will go.
❹ is it！ 改爲 it is！（註：因係感歎文，不是疑問文）
❺ some 改爲 any：any 改爲 some（註：做代名詞用時，any 是用於疑問文或否定文，some 是用於肯定文。）
❻ to 刪去
❼ are 改爲 is（註：Five dollars 雖然是複數，但在意義上却是指一筆的金額，所以主語看做單數）
❽ can 改爲 may（註：因係「可，不可」不是係「能，不能」）
❾ grow 改爲 growing（註：現在進行式）
❿ 全文改爲 What he did was right.

II. ❶ are ❷ faster ❸ so, as. ❹ severely
❺ badly ❻ by ❼ first, clear ❽ present
❾ with ❿ on

IV. ❶ Preparation ❷ Speaking ❸ Knowledge ❹ Reading
❺ Protection ❻ Imagination ❼ Thought ❽ Service
❾ Life ❿ Payment

V. ❶ Success ❷ Enemy ❸ Hate ❹ Husband
❺ Aunt ❻ Different ❼ Rare ❽ Foolish
❻ Kind ❿ Lose

## 省立嘉義女子中學

I. ❶ 宣佈 ❷ 微風 ❸ 駱駝 ❹ 雜誌
❺ 陸軍(或軍隊) ❻ 廣告 ❼ 鷹 ❽ 科學的
❾ 提供 ❿ 搖動 ⓫ toy ⓬ consideration
⓭ empire ⓮ kindness ⓯ temperature ⓰ cigarette
⓱ sadness ⓲ construction. ⓳ enemy ⓴ bank.

II. ❶ am ❷ to ❸ Have ❹ are ❺ is
❻ told ❼ more ❽ whom ❾ her ❿ he

III. ❶ 第一個的兒子會保持他所需要的水。第二個的兒子會長至他所希望的高度第三個的孩子會用滾水或冰水蓋身，而不受任何的損傷。第四個的兒子會使自己的身體堅硬得像在世界中最堅硬的東西。而第五個的兒子會從任何被人監禁的地方逃脫出來。
❷ 如果你將一些小石頭放入錫器內將它搖動，你會聽得響聲。石頭互相碰撞

，又撞錫器，而起振動。有的振動小，有的大，有的快，有的較慢。這全要靠石頭怎樣碰撞而定。因爲石頭碰撞的方法各不相同，而顯出一種混合的聲音。這種聲音全然不像音樂。

Ⅳ. ❶ To-day is the 15th of July.
❷ I have been studying English for three years.
❸ Yes, I do, because I can read many interesting stories through English.
❹ Yes, I do.
❺ There are seven members in my family.

## 省立嘉義高級農業職業學校

Ⅰ ❶ 牛乳 ❷ 水路 ❸ 農業 ❹ 畢業 ❺ 果…抑…
❻ 科學的 ❼ 爲…起見 ❽ 訪問 ❾ 和…同意 ❿ 簡而言之

Ⅰ ❶ upon ❷ I ❸ at ❹ who ❺ were
❻ opening ❼ did ❽ many ❾ coming ❿ do

Ⅱ ❶ 轉動之石不生苔（喻無恒心者永無所得。）
❷ 不久你就會對它習慣。
❸ 什麼事情阻碍他來我覺得奇怪。
❹ 充分生長的雛鷄，有三磅至六磅的重量。
❺ 他放棄出洋的心志。

Ⅳ ❶ There are many middle schools in Chia-yih.
❷ A man who is rich is not necessarily happy.
❸ She is taller than I by 2 inches.
❹ On Sunday, I go to church to attend divine service.
❺ What day of the week is this?

## 省立嘉義工業職業學校

Ⅰ ❶ loved, loved ❷ put, put ❸ sent, sent
❹ started, started ❺ read, read ❻ saw, seen
❼ wrote, written ❽ became, become ❾ taught, taught
❿ studied, studied

Ⅰ ❶ with ❷ without ❸ of ❹ from ❺ to
❻ of ❼ at ❽ came ❾ as ❿ on

Ⅱ ❶ I writting 改爲 I am writing ❷ Are 改爲 Do
❸ sees 改爲 see（註：未來式的動詞，沒有受人稱的變化）
❹ in 改爲 at（註：表示時刻的前置詞須用 at）
❺ old 改爲 older（註：因形容詞係比較級），me 改爲 I.
❻ hand 改爲 hands, foot 改爲 feet（註：因係複數）
❼ saw 改爲 see

❺ are 改爲 is (註：在 either…or…的文中，動詞的變化須與後者一致)
❾ many 改爲 much (註：表示程度須用 much)
⓫ among 改爲 between (註：「兩人之間」之意時用 between)

Ⅵ ❶ We say, "Good-bye". ❷ Yes, I have written it.
❸ I came here yesterday. ❹ I have ten dollars in my pocket.
❺ I have learned English for three years.

Ⅴ 我愛我國家。我愛我民族。我要我國家自由獨立。要我民族的幸福繁榮。我要爲我國家效勞，爲我民族服役。
我愛和平，但我將欣然地將爲眞理，爲自由，爲正義，而戰。我珍惜我的生命，但是我將欣然地爲我民族和爲我國家的光榮而犧牲生命。

## 省立嘉義商業職業學校

Ⅰ ❶ + ❷ − ❸ + ❹ + ❺ −
❻ − ❼ + ❽ − ❾ + ❿ +

Ⅱ

| | Present | Past | Past Participle | | Present | Past | Past Participle |
|---|---|---|---|---|---|---|---|
| ❶ | come | (came) | come | ❷ | (cut) | cut | cut |
| ❸ | know | knew | (known) | ❹ | keep | (kept) | kept |
| ❺ | (sit) | sat | sat | ❻ | fall | (fell) | fallen |
| ❼ | leave | left | (left) | ❽ | (begin) | began | begun |
| ❾ | (write) | wrote | written | ❿ | (let) | let | let |

Ⅲ ❶ The letter has been finished by you.
❷ He and she answer this question.
❸ They were told an interesting story by me.
❹ My teacher has taught this lesson.

Ⅳ ❶ whom 改爲 who ❷ good 改爲 well
❸ one another 改爲 each other ❹ or 改爲 nor
❺ his 改爲 him ❻ cold 改爲 colder
❼ who 刪去 ❽ to move 改爲 moving
❾ speaks 改爲 speak ❿ is reading 改爲 reads

Ⅴ ❶ whom ❷ of ❸ had ❹ with ❺ as
❻ were ❼ quite ❽ what ❾ who ❿ where

## 省立嘉義家專職業學校

Ⅰ ❶ 辦公室 ❷ 煙 ❸ 蠅 ❹ 聲音 ❺ 和平
❻ 高尚的 ❼ 跳 ❽ 歷史 ❾ 鄉村 ❿ 假日

Ⅱ ❶ hundred ❷ clean ❸ capital ❹ science
❺ water melon ❻ enemy ❼ calculation ❽ butterfly
❾ soldier ❿ suddenly

Ⅱ 空氣是我們生活所必需的。沒有空氣，人就不能生活。沒有攝取食物和水，人還能够活着數天，但是沒有空氣，雖然只有幾分鐘間，也沒有人會活着。

Ⅳ ❶ is ❷ has ❸ is ❹ came ❺ written
❻ who ❼ rises, sets ❽ tallest ❾ to ❿ are

## 省立虎尾中學

Ⅰ ❶ 時常努力做應做工作和負起應負責任。
❷ 童子軍對男女、老幼、貧富等都一樣是有禮貌的。
❸ 新的影片，或許會使現在的電影陳舊。
❹ 我們全都喜歡我們所沒有的東西，或希望做我們所不能做的事情。
❺ 充分地信任你已經決定的醫生。

Ⅰ ❶ 電視機 ❷ 魚肝油 ❸ 電氣 ❹ 教育 ❺ 舊金山
❻ 維生素 ❼ 乘客 ❽ 盥杯 ❾ 太平洋 ❿ 理論
⓫ 自由 ⓬ 教授 ⓭ 生日 ⓮ 牙醫 ⓯ 唾液
⓰ 零 ⓱ 消火器 ⓲ 大使 ⓳ 醫院 ⓴ 地質學家

Ⅰ ❶ I have many good friends.
❷ There are seven days in a week. They are Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday.
❸ I am a Chinese, you are a Japanese, and he is an American.
❹ It is not easy to learn English, and even less so to learn Chinese. (或 It is difficult to learn English, and even more difficult to learn Chinese,)
❺ For young men, reading is very important.

Ⅳ ❶ has ❷ are ❸ yours ❹ at ❺ Everyone
❻ that ❼ after ❽ am ❾ whose ❿ other

Ⅴ ❶ As soon as you arrive at Hongkong, please write to me.
❷ Whom does this book belong to?
❸ Men understand each other by means of words.
❹ Children are fond of toys.
❺ He is cheerful in spite of his failure in the entrance examination.

Ⅵ ❶ Do you look well?
❷ Is your mind filled with good thoughts?
❸ Have I finished my lesson?
❹ Does he ask our teachers some questions?
❺ Did she go home?

Ⅶ ❶ play 改爲 plays ❷ wents 改爲 went
❸ is 改爲 are (註：因 He and she 是兩個人即複數)
❹ as well as 改爲 and, am 改爲 are ❺ sweetly 改爲 sweet
❻ have 改爲 has (註：One of the boys是單數)
❼ to 刪去 ❽ in 改爲 at (註：「嘲笑」是 laugh at)

⑨ me 改爲 I (註：「比某某較……」的意思時，前置詞 "than" 的目的語須用主格)

⑩ me 改爲 I (註：knock at the door 的行爲者是 I.)

Ⅶ ❶ We are taught English by our English teacher.

❷ A letter was written by him. ❸ I take a book.

❹ My brother will be seen by me.

❺ My lessons have been finished by me.

Ⅺ ❶ Yes, he shonld smile. ❷ We say, "I am glad to see you."

❸ Yes, I have two sisters and three brothers.

❹ We can see red, orange and yellow colors.

❺ I am answering the questions of the entrance examination now.

Ⅹ ❶ bought, bought ❷ begin, begin ❸ told, told

❹ give, gave ❺ wrote, written ❻ go, gone.

❼ (was, were), been ❽ do, done ❾ sing, sang

❿ taught, taught

## 省立虎尾女子中學

Ⅰ 古時候有一個印度的老婦人來到這個城，談論青春的水泉。她說那水泉是在遠在北方的一個可愛的島上。這個島的名叫做巢美呢。

這個青年對這個女人發出種種的詢問。他想到她所說的事情，最後決心去尋找這個奇怪的水泉。這個女人說她要告訴道路給他。

Ⅱ ❶ I have to go to school every day.

❷ Did you see her yesterday?

❸ He is not fond of taking fish. ❹ How brave this soldier is!

❺ I will call on a friend of mine tomorrow.

Ⅲ ❶ A thief was caught by the policeman.

❷ A composition will be written by me.

❸ They killed the lion.

❹ Her sister has been sent to post the letter by her.

❺ Mr. Wang teaches the lesson.

Ⅳ ❶ lady 改爲 ladies ❷ we 改爲 us. ❸ him 改爲 he

❹ had come 改爲 came. ❺ met 改爲 meet. ❻ went 改爲 go.

❼ more 刪去 ❽ one another 改爲 each other

❾ swim 改爲 swimming. ❿ are 改爲 is.

Ⅴ ❶ are ❷ How ❸ than ❹ can ❺ many

❼ was ❽ has ❾ be ❿ who

Ⅵ ❶ any ❷ Were ❸ broken ❹ go ❺ hard

❻ whom ❼ whom ❽ in ❾ likes ❿ much

## 省立臺南第一中學

I. ❶ He is always proud of his father's position.
❷ That soldier is well equipped with arms.
❸ Formosa is a province rich in rice.
❹ Last summer, my father went to the Sun-and-Moon Lake in company with me.
❺ I am much interested in the study of English.

II. ❶ with ❷ beneath ❸ to ❹ with ❺ without

III. ❶ in 改爲 with
❷ to go 改爲 from going (慣用的型式是 prevent one from……ing, 阻礙人做……: 例 The rain prevented me from coming. 因下雨不能來。)
❸ broke 改爲 broke out (註: 火災的「發生」是 break out.)
❹ in 改爲 into (註: 向內面進入的動作, 前置詞須用 into.)
❺ not 改爲 not to

IV. ❶ A: 冠詞, "student" 的修飾語。 diligent: 形容詞, "student" 的修飾語。 student: 名詞, 文中的主語。 will be: 動詞, 述語。 never: 副詞, "will be" 的修飾語。 idle: 形容詞, "student" 的修飾語。
❷ We: 主語, 代名詞。 always: 副詞, "go" 的修飾語。 go: 動詞, 述語。 to school: 副詞句, "go" 的修飾語。 (to: 前置詞。 school: 名詞, 前置詞 "to" 的目的語。) in the morning: 副詞句, "go" 的修飾語。 (in: 前置詞。 the: 冠詞。 morning: 名詞。前置詞 "in" 的目的語。)
❸ Each: 形容詞, "boy" 的修飾語。 boy; 名詞, 主語。 has: 動詞, 述語。 his: 代名詞, "responsibility" 的修飾語。 responsibility: 名詞, "has" 的目的語。
❹ English: 名詞, 主語。 is: 動詞, 述語。 important: 形容詞, "English" 的修飾語。 to every boy or girl: 副詞句, "important" 的修飾語。 (to: 前置詞。 every: 形容詞, "boy or girl" 的修飾語。 boy: 名詞。 girl: 名詞。 boy 和 girl 都是前置詞 "to" 的目的語。 or: 連接 "boy" 和 "girl" 的連接詞。)

V. A. ❷ B. ④ A. ④ B. ④

## 省立臺南第二中學

I ❶ served at, to ❷ down ❸ should ❹ but ❺ who
❻ whether, or ❼ and a ❽ from ❾ of ❿ in, between

II ❶ of 改爲 from ❷ with 改爲 at ❸ I afraid of 改爲 I am afraid of ❹ to move 改爲 moving

❺ kindly and beautifully 改爲 kind and beautiful
❻ can not 改爲 can ❼ a 改爲 the ❽ more 刪去, you 改爲 yours
❾ 兩個 his 全改爲 her ❿ 全文改爲 Has your book been found?

II ❶ loves ❷ has ❸ must ❹ set ❺ lying
❻ much ❼ on ❽ too ❾ I ❿ teeth

IV ❶ The work was begun yesterday, by them.
❷ He was paid some money by me for his service.
❸ A new house is being built by them.
❹ This uniform has been worn by me for years.
❺ Some new songs will be sung to us by her.

V ❶ He said to me that I was a great friend of his.
❷ She says that she is not feeling well to-day.
❸ He asked me whether my brother had come.
❹ Our teacher said that great hopes make great men.
❺ They replied that they might not need my help.

VI ❶ 她送他到學校去，在那裏他的智識使所有的人驚服。在他十七歲時，便很有名氣，而被任命一個公務。數年後，當他的母親去世時，他離開他的職務，在他母親的墓傍服喪三年。
❷ A boy scont obeys his parents at home.
❸ Have you ever seen an airplane?
❹ I have already graduated from the junior middle school.
❺ My elder sister has two knives.

## 省立臺南女子中學

I ❶ No ❷ No ❸ Yes ❹ No ❺ No
❻ No ❼ Yes ❽ Yes ❾ No ❿ Yes

II ❶ beautiful 刪去 ❷ can 刪去 ❸ my 刪去 ❹ had been 刪去
❺ is lain 刪去 ❻ oldest 刪去 ❼ his 刪去
❽ to sing 刪去 ❾ who 刪去 ❿ good 刪去

III ❶ from ❷ to ❸ or ❹ interesting ❺ is
❻ generally ❼ than ❽ whom ❾ December ❿ on

IV ❶ yours ❷ hers ❸ He ❹ She ❺ It
❻ it ❼ He ❽ her ❾ it ❿ him

V ❶ The fly is one of the most dangerous enemy of men.
❷ Will you please give me that pen?
❸ A polite man always takes off his hat to a lady.
❹ They are very much alike because they are brothers.
❺ Once upon a time, there was a king who had great wealth and power.

## 省立臺南高級工業職業學校

I ❶ Yes ❷ Yes ❸ Yes ❹ No ❺ No
❻ No ❼ Yes ❽ Yes ❾ Yes ❿ Yes

I ❶ great many ❷ a pair of ❸ instead of
❹ so that ❺ fond of

I ❶ fights 改爲 fight ❷ mother 改爲 the mother
❸ 不要改 ❹ under 改爲 by
❺ love 改爲 loves, loves 改爲 love.

N ❶ at ❷ in ❸ to ❹ across ❺ of

V ❶ 正直 ❷ 政策 ❸ 史記 ❹ 易經 ❺ 詩經
❻ 春秋 ❼ 禮記 ❽ 行爲 ❾ 記憶 ❿ 國民
⓫ The Republic of China ⓬ The United States of America
⓭ patriotism ⓮ absolutism ⓯ president
⓰ mathematics ⓱ Free China ⓲ country
⓳ people ⓴ liberty

## 省立工學院附設工業職業學校

I ❶ 空氣 ❷ 商業 ❸ 化學 ❹ 都市 ❺ 女兒
❻ 辭典 ❼ 教育 ❽ 偉大 ❾ 歷史 ❿ 報紙

I ❶ Who ❷ what ❸ who ❹ which ❺ which

I ❶ Hurrah, the Republic of China.
❷ I love the Republic of China.
❸ The vacation of our school has begun.
❹ Sir, may I go out? ❺ They went for swimming yesterday.

N ❶ in 改爲 on ❷ me 改爲 I ❸ 不要改
❹ many 改爲 much ❺ blow 改爲 blowing

V ❶ It is half past ten. ❷ Yes, I am a student.
❸ It is blue. ❹ I have studied English for three years.
❺ Yes, I am very busy today.

## 臺南市私立長榮中學

I ❶ am 改爲 are ❷ pleasantly 改爲 pleasan ❸ are 改爲 is
❹ came 改爲 come ❺ me 改爲 I ❻ the best 改爲 the better
❼ are 改爲 is ❽ done 改爲 did ❾ to 刪去
❿ ought 改爲 ought to

I ❶ to ❷ where ❸ to ❹ of ❺ on
❻ whom ❼ which ❽ for ❾ at ❿ on

I ❶ I was asked a question by him. ❷ I see a bird.

❸ A letter is being written by her.
❹ A pencil has been bought by me.

Ⅳ ❶ 他是一位學問很深的人。 ❷ 你是一位百萬富翁。
❸ 人是爲生存而吃，不是爲吃而生存。 ❹ 中國是我們的祖國。
❺ 每天讀報會增加自己的常識。

Ⅴ ❶ He is an honest man. ❷ Are you fond of swimming?
❸ I have already studied English for three years.
❹ We will go to Taipei tomorrow.
❺ When you came, I was just playing tennis.

## 省立高雄中學

Ⅰ ❶ tolds 改爲 told ❷ will go 改爲 went, 或 yesterday 改爲 tomorrow
❸ to move 改爲 moving ❹ play 改爲 playing ❺ or 改爲 nor
❻ who 改爲 whom ❼ My table's leg 改爲 the leg of my table.
❽ 全文改爲 I myself saw the thief entering.

Ⅱ ❶ where ❷ but ❸ till ❹ to drink
❺ are ❻ the strongest ❼ between ❽ girls'

Ⅲ ❶ I was sure that he was absent.
❷ It was an interesting book, but I could not read it.
❸ The man noded his head and didn't say a word.
❹ They fought a good fight.
❺ Mrs. A told her son not to be afraid.
❻ The sky was as dark as it could be.
❼ I opened the window that I might see the moon.
❽ You told me to go home as quickly as possible because it was getting late, and I thought it would be wise to follow your advice instead of delaying any longer.

Ⅳ ❶ He said that it would rain.
❷ My friend wrote me, "I am going to see you."
❸ He told me to go in.
❹ He told me, "Failure is the mother of success."

Ⅴ ❶ 最初他覺得英語是很困難，但是後來他得到很大的進步。
❷ 教師叫我們看黑板，不要看我們的書。
❸ 醫師叫他每天下午必須躺下休息一小時。
❹ 如果你希望要獲得較好的分數，那麼在學習中須更加恒耳聽講爲要。
❺ Have you ever seen that flower? How beautiful it is!
❻ As it is very fine to-day, we went to the park for taking a walk.
❼ Some friends came to see us last night.
❽ We had waited for him for a long time, and at last he came.

## 省立高雄女子中學

I (A) ❶ responsibility ❷ difficult ❸ imagination
❹ victory ❺ freedom ❻ airplane ❼ education
❽ bus ❾ brave ❿ property

(B) ❶ 學習 ❷ 利益，或優越 ❸ 部，科，局 ❹ 潛水艇
❺ 徘徊 ❻ 食事，一餐 ❼ 愚昧的 ❽ 不同的
❾ 記憶 ❿ 再

II ❶ of ❷ and ❸ you 或 I ❹ at ❺ how
❻ to ❼ up ❽ faster ❾ of ❿ on

III ❶ don't 改爲 doesn't ❷ study 改爲 studied
❸ to talk 改爲 talking ❹ wrote 改爲 was written
❺ at 改爲 in ❻ a greatest scholar 改爲 the greatest scholar
❼ Chineses 改爲 Chinese ❽ some 改爲 any
❾ go 改爲 goes ❿ tooth 改爲 teeth

IV ❶ father……subject, man……complement.
❷ young……adjective, across the river……adverbial phrase.
❸ who makes clothes,……modifier of "the man"
❹ The……definate article, of his house……modifier of the roof
❺ To love our enemy……infinitive, teaching……complement
❻ apples……subject, are……predicate, intransitive verb.
mine……possesive pronoun.
❼ smiling……present participle used as adjective, heart……object
hardened……participial adjective
❽ to ride my bicycle……infinitive.
❾ playing……present participle used as adjective.
❿ thinking…… present progressive participle.
him……indirect object money……direct object

V ❶ We shonld love our country.
❷ How many persons are there in your family?
❸ I rise at half past five every morning.
❹ The sun is much larger than the moon.
❺ Do not do to others that which you do not wish to be done to yourself.

VI ❶ I have come from Ping-tung.
❷ There are four seasons in a year.
❸ I speak Chinese.
❹ I have been in Taiwan for six years.

## 省立高雄工業職業學校

I ❶ ×was ❷ ×come ❸ ×lain (註：本題真是

「放置」之意，所以動詞是要用 lay, laid, laid 之中的過去分詞 "laid"）

❹ ×broke ❺ ×have（註：neither of them 是單數）

❻ ×which（註：人的關係代名詞要用 that） ❼ ×him ❽ ×badly

❾ ×good ❿ ×shall（註：表示主語的有意思未來須用 will）

I (a) 在世界上大概沒有比魯濱遜漂流記更出名的故事。如英國少男少女一樣，中國少男少女也同樣地對它很感興趣。不但兒童，就是成人也愛聽和讀這個在一個島上孤獨在渡過二十三年的人的冒險史。

(b) 這個故事的大部份是描述魯濱遜如何地尋找遮蔽所和食物，如何地建立他的「堡壘」，如何地製造他的家具和衣服，和如何自學許多的交易和自成爲做各種有用東西的專家。

I ❶ at ❷ depend ❸ with

❹ of, by, for ❺ not, as ❻ of, in

❼ whom, had ❽ am, the ❾ against

## 省立高雄商業職業學校

A. ❶ (×) ❷ (×) ❸ (×) ❹ (×) ❺ (×)

❻ (○) ❼ (○) ❽ (○) ❾ (○) ❿ (○)

B. ❶ finger 改爲 fingers ❷ go 改爲 goes ❸ can 改爲 could

❹ sheeps 改爲 sheep（註：sheep 可用做單數，也可用做複數）

❺ a 改爲 an ❻ a 改爲 an（註：因 honest 的頭音是 'o" 即母音）

❼ to 改爲 till ❽ among 改爲 between（註：兩人間用 between）

❾ since tomorrow 改爲 after tomorrow ❿ whom 改爲 who

C. ❶ of ❷ of ❸ by ❹ to ❺ of

❻ from ❼ to ❽ for ❾ in ❿ to

D. ❶ of ❷ at ❸ in ❹ from ❺ has

E.

| | | | |
|---|---|---|---|
| studied | studied | knew | known |
| did | done | gave | given |
| saw | seen | lay | lain |
| read | read | put | put |
| became | become | sent | sent |

F.

| | | | |
|---|---|---|---|
| smaller | smallest | closer | closest |
| happier | happiest | better | best |
| less | least | hotter | hottest |
| bigger | biggest | more useful | most useful |
| worse | worst | more | most |

G. friends grasses women bodies mice feet

pianos monarchs handkerchiefs birthdays herselves

H. ❶ A dog is seen by them. ❷ A letter was written by me.

❸ I shall be taught by him. ❹ We have been tanght by him.

❺ She was told a story by me.

## 省立屏東中學

I. (a) ❶ (−) ❷ (−) ❸ (−) ❹ (+) ❺ (−)
❻ (−) ❼ (−) ❽ (−) ❾ (+) ❿ (+)

(b) ❶ without ❷ diligent ❸ ever ❹ quickly
❺ shut ❻ buy ❼ lately ❽ husband
❾ heroin ❿ down

II. (a) ❶ happier happiest ❷ fatter fattest
❸ more difficult most difficult ❹ older oldest
❺ more splendid most splendid

(b) ❶ ate, eaten ❷ saw, seen ❸ knew, known
❹ came, come ❺ lost, lost

(c) ❶ teeth ❷ cities ❸ halves ❹ pianos ❺ boxes

III. (a) ❶ The child was run over by a car.
❷ He and I answer the questions.
❸ I wrote this book.
❹ A fish has been caught by him.
❺ A new lesson will be learned by us.

(b) ❶ I have lost the watch which I bought yesterday.
❷ That is the man whom I met yesterday.
❸ He brings a book which belongs to me.
❹ The book which is on the desk is yours.
❺ A boy who works hard is John.

IV. ❶ He is a friend of mine, faithful and just to me.
❷ His sister invited us to visit hers.
❸ Whom do you see in the school?
❹ I am reading just now.
❺ Have you ever seen a lion?
❻ We have studied English for two years.
❼ There were some boys in the garden.
❽ Don't jump after eating.
❾ You are more powerful than he.
❿ Let him come.

V. ❶ He is as tall as you.
❷ Where are you living?
❸ I met her on the street yesterday.
❹ He is not so wise as you.
❺ I like him, but he does not like me.

VI ❶ When I stood on the platform, every body looked at me.

❷ In the examination, every student is afraid of making mistakes.
❸ I bought an English dictionary yesterday.
❹ Read this story please. It is very interesting.
❺ In summer, many people go to seashore for bathing.

## 省立屏東女子中學

A. a. ❶ summer ❷ mathematics ❸ state ❹ spring
❺ health ❻ breakfast ❼ sugar-cane
❽ responsibility ❾ satisfaction ❿ family

b. ❶ 蚊 ❷ 自由 ❸ 禮儀 ❹ 匙 ❺ 美猶的
❻ 中國 ❼ 考試 ❽ 初中 ❾ 電話 ❿ 生日

B. ❶ I get up at 6 o'clock in the morning.
❷ The name of my school is (填寫自己的學校名)
❸ I have learned English for three years.
❹ No, we don't do so.

C. ❶ give 改爲 gave: box 改爲 boxes.
❷ in 改爲 on ❸ tell 改爲 told ❹ have 改爲 has
❺ 全文改爲 We have no water to drink. ❻ we 改爲 us
❼ not 改爲 do not ❽ am 改爲 are ❾ Can 改爲 May
❿ some 改爲 any

D. ❶ while, while ❷ to ❸ both, and ❹ with
❺ nor ❻ had ❼ at ❽ tired
❾ am ❿ better

E. ❶ May, I come in? ❷ I will call on you tomorrow.
❸ I am a good student.
❹ As we are all Chinese, so we speak Chinese.
❺ I am very glad to see you. ❻ My mother loves me.
❼ Where are you going? ❽ Give me a cup of water, please.
❾ How many days are there in a week?
❿ How old is your elder brother?

## 省立屏東農業職業學校

I ❶ 玉蜀黍 ❷ 期待 ❸ 常常 ❹ 溫度
❺ 象 ❻ 生日 ❼ 庭園 ❽ 農夫
❾ 呼吸 ❿ 天氣 ⓫ July ⓬ gale
⓭ forget ⓮ where ⓯ to telephone ⓰ important
⓱ travel ⓲ to obey ⓳ regular ⓴ know

II ❶ Does ❷ the ❸ older ❹ sweetly
❺ written ❻ am ❼ as ❽ is

❹ to ⑩ who

I ❶ ring 改爲 rings ❷ are 改爲 is ❸ haring 改爲 heard
❹ to 刪去 ❺ making 改爲 made ❻ meet 改爲 met
❼ he 改爲 him ❽ a 改爲 an ❾ use 改爲 useful
❿ quickly

IV ❶ This dictionary is much better than that one.
❷ The cat runs after the mouse.
❸ I will call on you between four and five o'clock.
❹ By and by the teacher came into the class-room.
❺ Not only I, but all the rest were punished by the teacher.

V 植物需要雨水。它們需要日光，也需要土壤。土壤有很多種。一種土壤在雨天時是粘的。那種土壤叫做粘土。又有一種土壤是全部將近是砂。雨水很快就漏過那種土壤。土壤常常包含腐朽的葉子和小量腐爛的植物。

## 省立花蓮中學

I A. ❶ 壺 ❷ 蚊 ❸ 脚踏車 ❹ 健康 ❺ 港
B. ❶ train ❷ performer ❸ empire ❹ music ❺ revolution

I ❶ to ❷ in ❸ with ❹ than ❺ at

II ❶ goes 改爲 go ❷ men 改爲 man, stand 改爲 is standing
❸ you are 改爲 are you ❹ do you came 改爲 did you come
❺ study 改爲 studies

IV ❶ Judoh said that what should they gain if they kill their brother?
❷ She said that she was a hen. ❸ John says that he hates him.
❹ She said that she loved him as much as she did herself.
❺ Mary said that she was there.

V ❶ 那個人一天一天，一星期一星期，繼續地只說同樣的話。
❷ 現在的飛機比最初做的飛機好的多，但是大部分的現在的飛機和最初的飛機多少有點相似的。

VI ❶ It is not difficult to answer this question.
❷ He is not only honest, but also clever.
❸ I have already studied English for three years.
❹ I should devote myself in study.

## 省立臺東中學

I ❶ walks ❷ came ❸ is shining ❹ has visited ❺ tells
❻ left ❼ was sleeping ❽ will be ❾ will forget ❿ lived

II ❶ whom ❷ what ❸ who ❹ that ❺ whose

III ❶ Everybody loves a good boy.
❷ She was laughed at by most of her friends.

❸ The letter has been finished by me.
❶ The work will be done by him.
❺ A letter is being written by her.

Ⅳ ❶ a 改爲 an ❷likes 改爲 like (註：在 Does 已經加了 "s" 所以不要重複)
❸ older 改爲elder ❶ whom 改爲who ❺ tells 改爲told (註：因係過去時)
❻ dead 改爲 died (註：用過去式 The man……died 才對)
❼ is 改爲 was (註：因係過去時) ❽ to 刪去 ❾ breaking 改爲 broken
❿ the book's cover 改爲 the cover of the book.

Ⅴ ❶ (○) ❷ (×) ❸ (×) ❹ (×) ❺ (○)
❻ (○) ❼ (○) ❽ (○) ❾ (○) ❿ (○)

Ⅵ ❶ watches ❷ teeth ❸ thieves ❹ leaves ❺ sheep

Ⅶ ❶ lady ❷ aunt ❸ she-goat ❹ cow ❺ mother-in-law

Ⅷ ❶ they ❷ who ❸ better ❹ to tell ❺ was studying

Ⅸ finally ⑤ journey ⑩ much ⑦ look after ③ shore ⑨
tiny ⑧ watch ④ sweet ② in vain ① ocean ⑥

Ⅹ ❶ It has already been five years since she lived Taipei.
❷ He often meets Mr. Wang.
❸ When she came last night, I was just reading English.
❹ I taught him Chinese last year.
❺ Can you write a letter in English?

## 省立馬公中學

Ⅰ ❶ My elder sister is very fond of music.
❷ My mother gets up early in the morning.
❸ A great deal of my time has been spent in studying English.
❹ She is not only beautiful, but also very clever.
❺ Among my four brothers, I like the youngest one best.

Ⅱ ❶ is 改爲 am ❷ he 改爲 him
❸ have 改爲 has, brother 改爲 brothers
❹ is 改爲 are ❺ will 改爲 shall
❻ wrote 改爲 written, she 改爲 her ❼ study 改爲 studies
❽ am 改爲 were ❾ finish 改爲 finished, you 改爲 your
❿ good 改爲 better

Ⅲ ❶ very ❷ as ❸ an ❹ with ❺ of

Ⅳ ❶ ① I am a Chinese student.
② I have a new book, and I am very fond of it.
③ He asked me, "Will you come tomorrow?"
④ Why do you know he is a foreigner?
⑤ I love my country.

❷ 下星期二，七點在上海酒家舉行的宴會，接到您的招請，非常高興。我期待看見大兄。

# 數學科解答

## 省立臺北工業專科學校

❶ (a) $x^4+4=x^4+4x^2+4-4x^2=(x^2+2)^2-(2x)^2=(x^2+2+2x)(x^2+2-2x)$
$=(x^2+2x+2)(x^2-2x+2)$

(b) $x^2+y^2+2xy+8x+8y-9=(x+y)^2+8(x+y)-9=(x+y+9)(x+y-1)$

答： (a) $(x^2+2x+2)(x^2-2x+2)$ (b) $(x+y+9)(x+y-1)$

❷ (a) $\dfrac{\dfrac{a}{x}-\dfrac{x}{a}}{a-\dfrac{x^2}{a}}=\dfrac{ax\left(\dfrac{a}{x}-\dfrac{x}{a}\right)}{ax\left(a-\dfrac{x^2}{a}\right)}=\dfrac{a^2-x^2}{a^2x-x^3}=\dfrac{a^2-x^2}{x(a^2-x^2)}=\dfrac{1}{x}$

(b) $3\sqrt{20}+5\sqrt{\dfrac{1}{5}}-\dfrac{1}{3}\sqrt{45}-2\sqrt{80}=3\sqrt{4\times5}+5\sqrt{\dfrac{5}{25}}-\dfrac{1}{3}\sqrt{9\times5}$
$-2\sqrt{16\times5}=6\sqrt{5}+\sqrt{5}-\sqrt{5}-8\sqrt{5}=-2\sqrt{5}$

答：(a) $\dfrac{1}{x}$ (b) $-2\sqrt{5}$

❸ (a)
$$\begin{cases}\dfrac{2}{x}+\dfrac{3}{y}=\dfrac{29}{35}\ ① & ①+②\times3 \quad \dfrac{17}{x}=\dfrac{29}{35}+\dfrac{18}{7} \quad \dfrac{17}{x}=\dfrac{29}{35}+\dfrac{90}{35}\\ \dfrac{5}{x}-\dfrac{1}{y}=\dfrac{6}{7}\ ② & \dfrac{17}{x}=\dfrac{119}{35} \quad \dfrac{1}{x}=\dfrac{7}{35} \quad \dfrac{1}{x}=\dfrac{1}{5} \quad \therefore x=5\end{cases}$$

將此值代入 ② $1-\dfrac{1}{y}=\dfrac{6}{7}$ $-\dfrac{1}{y}=-\dfrac{1}{7}$ $\therefore y=7$

(b) $\dfrac{x-9}{x-12}=\dfrac{x-21}{x-33}$ $\dfrac{x-9}{(x-12)-(x-9)}=\dfrac{x-21}{(x-33)-(x-21)}$ $\dfrac{x-9}{-3}=\dfrac{x-21}{-12}$

$x-9=\dfrac{x-21}{4}$ $4x-36=x-21$ $3x=15$ $\therefore x=5$

此值不使原方程式之分母爲0

答： (a) $x=5,\ y=7$ (b) $x=5$

❹ (a) $(100+3k)x^2-44x+4=0$ 之兩根相等，

故 $(-22)^2-4(100+3k)=0$ $484-400-12k=0$

$84-12k=0$ $7-k=0$ $\therefore k=7$

(b) $(3+\sqrt{2})+(3-\sqrt{2})=6$ $(3+\sqrt{2})(3-\sqrt{2})=9-2=7$

故此方程式爲 $x^2-6x+7=0$

答： (a) $k=7$ (b) $x^2-6x+7=0$

❺ (a) $(x+y)^2$與$(x-y)^2$的等差中項爲$\dfrac{(x+y)^2+(x-y)^2}{2}=\dfrac{2(x^2+y^2)}{2}=x^2+y^2$

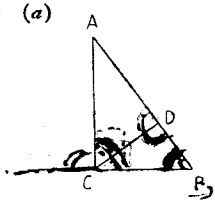
(b) 設此等比級數之公比爲 $r$，則 $\dfrac{1}{8}r^{4+2-1}=128$ $r^5=1024$ $r^5=4^5$ $\therefore r=5$,

因此，所求之 4 個等差內項爲$\dfrac{1}{8}\times4=\dfrac{1}{2}$， $\dfrac{1}{2}\times4=2$, $2\times4=8$,

$8\times4=32$.

答：(a) $x^2+y^2$ (b) $\frac{1}{2}$, 2, 8, 32.

❻ (a)



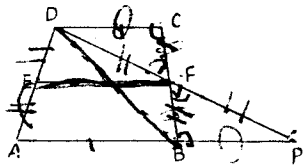

〔已知〕$\triangle ABC$中，$\angle ACB=\angle R$，　$CD\perp AB$

〔求證〕$\angle ACD=\angle B$

〔證明〕$\angle ACD+\angle BCD=\angle R$，　$\angle BCD+\angle B=\angle R$

$\therefore \angle ACD=\angle B$

(b)




〔已知〕$ABCD$爲梯形（$DC/\!/BC$）

$AE=ED$，$BF=FC$

〔求證〕$EF=\frac{1}{2}(AB+DC)$

〔證明〕聯結$DF$，延長到$P$，與$AB$的延長線相交，則

$$\left.\begin{matrix}CF=BF\\ \angle CFD=\angle BFP\\ \angle DCF=\angle PBF\end{matrix}\right\}\ \therefore\ \triangle CFD\equiv\triangle BFP\ \ \therefore\ DF=FP\ \ DC=BP$$

又於$\triangle DAP$，

$$\left.\begin{matrix}DE=EA\\ DF=FP\end{matrix}\right\}\ \therefore\ EF=\frac{1}{2}AP=\frac{1}{2}(AB+BP)=\frac{1}{2}(AB+DC)$$

❼ (a)〔已知〕於$\triangle ABC$，$AB=AC$，

用$AB$做直徑的圓交$BC$於$D$，

〔求證〕$BD=DC$

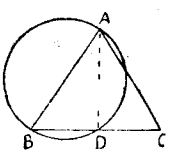
〔證明〕半圓內的圓周角是直角

$\therefore \angle ADB=\angle R$

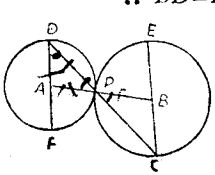
在$\triangle ABD$及$\triangle ACD$

$$\left.\begin{matrix}AB=AC\\ AD\text{公共}\\ \angle ADB=\angle ADC=\angle R\end{matrix}\right\}\ \therefore\triangle ABD\equiv\triangle ACD$$

$\therefore\ BD=DC$




(b)




〔已知〕二圓$A$，$B$外切於$P$，$CPD$爲過切點割線，$CE$，$DF$爲直徑

〔求證〕$CE/\!/DE$

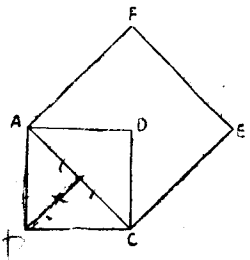
〔證明〕二圓$A$，$B$外切於$P$，故三點$A$,$P$,$B$在一直線上

因$AP=AD$ $\therefore\angle APD=\angle ADP$，

$BP=BC$ $\therefore\ \angle BPC=\angle BCP$ 又$\angle APD=\angle BPC$ $\therefore\ \angle ADP=\angle BCP$

即 $\angle FDC=\angle ECD$ $\therefore CF/\!/DF$

❽ (a)




〔作圖〕已知正方形爲$ABCD$，作對角線$AC$，以$AC$爲一邊，作正方形$ACEF$

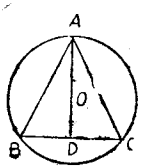
〔證明〕於$\triangle ABC$，$\angle B=\angle R$，$AB=BC$，

$\therefore \overline{AC}^2=\overline{AB}^2=\overline{BC}^2=2\overline{AB}^2$

即正方形$ACEF=2$正方形$ABCD$

〔討論〕恒有一解

(b)




〔解〕設$\triangle ABC$之面積爲$12\sqrt{3}$方寸，作外接圓$O$，聯結$AO$，延長到$D$，與$BC$相交，則$AD\perp BC$

$AO=\frac{2}{3}AD$，$AD=\frac{\sqrt{3}}{2}BC$，設$AO=r$寸，

則$AD=\frac{3}{2}r$，$BC=\frac{2}{\sqrt{3}}\times\frac{3}{2}r=\frac{3}{\sqrt{3}}r=\sqrt{3}r$　由題意得方程式$\frac{1}{2}\times\sqrt{3}r\times\frac{3}{2}r=12\sqrt{3}$

即$\frac{3\sqrt{3}}{4}r^2=12\sqrt{3}$　$r^2=12\times\frac{4}{3}=16$　$\therefore r=4$　答 4寸

## 省立臺北師範學校

一 是非題

❶ × ❷ ○ ❸ ○ ❹ × ❺ ×〔註〕$a^{\frac{n}{m}}=\sqrt[m]{a^n}$ ❻ ×

〔註〕$(x+i)(x-i)=x^2-i^2=x^2-(-1)=x^2+1$ ❼ × ❽ × ❾ ○ ❿ ○

二 填充題

❶ 72 ❷ $2\frac{251}{1665}$〔註〕$2.3\dot{}-0.1\dot{8}2\dot{5}=2\frac{3}{9}-\frac{1825-1}{9990}=2\frac{1}{3}-\frac{1824}{9990}$

$=2\frac{555}{1665}-\frac{304}{1665}=2\frac{251}{1665}$ ❸3〔註〕15 隻$\times\frac{3}{6}\times\frac{2}{5}=3$隻

❹ $-\sqrt{abc}\,i$〔註〕假定$a>0$，$b>0$，$c>0$ ❺ $(2x-3)(3x-5)$

❻ $(x-2a)(2+ax)$ ❼2〔註〕$1\div(1-\frac{1}{2})=1\div\frac{1}{2}=2$

❽ 重心，$\frac{2}{3}$ ❾ 8，4 ❿ 比例中項

三 (6粒$-$4粒)$\times2=$4粒……如果每人各給6粒，應不够這粒數

(3粒$+$4粒)$\div$(6粒$-$5粒)$=7$(人)……人數

5粒$\times7+3$粒$=38$粒……糖果數

答：兒童7人，糖果38粒

四 $1\div(\frac{1}{5}+\frac{1}{8})=1\div(\frac{8}{40}+\frac{5}{40})=1\div\frac{13}{40}=\frac{40}{13}=3\frac{1}{13}$ …… 二人合作所需的日數

答：二人合作 $3\frac{1}{13}$ 日可成

五 (a) $\sqrt{-50}-\sqrt{-18}+\sqrt{-8}=\sqrt{25(-2)}-\sqrt{9(-2)}+\sqrt{4(-2)}$

$=5\sqrt{-2}-3\sqrt{-2}+2\sqrt{-2}=4\sqrt{-2}=4\sqrt{2}i$ 答：$4\sqrt{2}i$

(b) $\frac{\sqrt{2}}{\sqrt{7}-\sqrt{3}}=\frac{\sqrt{2}(\sqrt{7}+\sqrt{3})}{(\sqrt{7}-\sqrt{3})(\sqrt{7}+\sqrt{3})}=\frac{\sqrt{14}+\sqrt{6}}{7-3}$

$=\frac{\sqrt{14}+\sqrt{6}}{4}$ 答：$\frac{\sqrt{14}+\sqrt{6}}{4}$

六 $\begin{cases}x^3-y^3=189\cdots\cdots①\\ x^2+xy+y^2=63\cdots\cdots②\end{cases}$ ①÷② $x-y=3$ $x=y+3$ ③

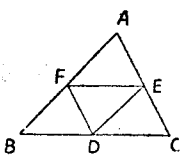
③代入② $(y+3)^2+(y+3)y+y^2=63$

$y^2+6y+9+y^2+3y+y^2-63=0$ $3y^2+9y-54=0$

$y^2+3y-18=0$ $(y+6)(y-3)=0$ $\therefore y=-6,\ 3$ 代入③得 $x=-3,\ 6$

答：$\begin{cases}x=-3\\ y=-6\end{cases}$ $\begin{cases}x=6\\ y=3\end{cases}$

七




〔已知〕 於$\triangle ABC$, $AF=FB$, $BD=DC$, $AE=EC$

〔求證〕 $\triangle ABC\backsim\triangle DEF$

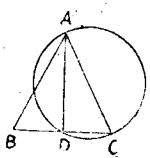
〔證明〕 於$\triangle ABC$, $AF=FB$, $AE=EC$

$\therefore EF=\frac{1}{2}BC$, 同樣 $DE=\frac{1}{2}AB$,

$DF=\frac{1}{2}AC$, 於$\triangle ABC$, $\triangle DEF$,

$AB:BC:AC=DE:EF:DF$ $\therefore\triangle ABC\backsim\triangle DEF$

八




〔已知〕 於$\triangle ABC$, $AB=AC$

用 $AC$ 做直徑的圓與 $BC$ 交於 $D$

〔求證〕 $BD=DC$

〔證明〕 連結$AD$, 則 $\angle ADC=\angle R$ $\therefore\angle ADB=\angle R$

於$\triangle ADB$, $\triangle ADC$, $AD$ 爲共通 $\angle ADB=\angle ADC=\angle R$ $AB=AC$ $\therefore\triangle ADB\equiv\triangle ADC$ $\therefore BD=DC$

## 省立臺北女子師範學校

I 是非題

❶ − ❷ + ❸ + ❹ − ❺ + ❻ − ❼ − ❽ − ❾ − ❿ +

⓫ + ⓬ − ⓭ + ⓮ − ⓯ +

II 填充題

❶ 「×」「÷」,「+」「−」 ❷ 圓周率 ❸ 1 ❹ $\frac{1}{a^5}$ ❺ $\frac{1}{12}$

❻ $x,\ y$ ❼ $a-b$ ❽ $xy$ ❾ $\sqrt{ab}$ ❿ $-6$ ⓫ $a^2+b^2$ ⓬ $(2n-4)$

直角 ⑭ 一點(重心) ⑬ 弧 ⑮ 斜邊，2倍

## I 計算題

❶ $32人\div\frac{4}{7}=\overset{8}{\cancel{32}}人\times\frac{7}{\cancel{4}_{1}}=56人$ 答：二年級有56人

❷ 5)225 360 $5\times3^2=45$

3) 45 72 求225和360的最大公約數得45，這就是所求碗櫥的最多格數

3) 15 24 答：這碗櫥最多有45格

5 8

❸

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | −3 | 0 | +5 | 0 | −3 | −1 | |
| 3 | | | | | | | |
| | −3 | 0 | +5 | | | | |
| | −3 | +3 | −1 | | | | |
| | | −3 | +6 | 0 | −3 | −1 | |
| | | −3 | +6 | 0 | −3 | −1 | |
| | | | | | | 0 | |

| | | | | |
|---|---|---|---|---|
| | 1 | −1 | −1 | |
| 3 | | | | 3 −1 |
| | −3 | +1 | | −1 |
| 3 | −3 | +1 | | −1 |
| | | 1 | | 3 −3 −1 |
| 3 | −6 | +3 | | −1 |
| | | −3 | +3 | +1 |
| 3 | −6 | 0 | +3 | +1 |

答：$x^2-x-1$

❶ $x^2+6x-16=0$ $(x+8)(x-2)=0$ $\therefore x=-8$，或 2

答：$x=-8, 2$

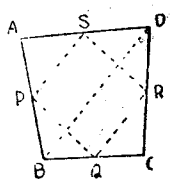
## IV 證明題

❶ 〔已知〕四邊形$ABCD$中，$AP=PB$，$BQ=QC$，$CR=RD$，$DS=SA$

〔求證〕$PQRS$爲平行四邊形

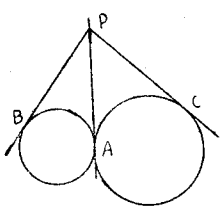
〔證明〕於$\triangle ABD$，$AP=PB$，$AS=SD$

$\therefore PS\parallel\frac{1}{2}BD$ 於$\triangle CBD$，$CQ=QB$，$CR=RD$ $\therefore QR\parallel\frac{1}{2}BD$




因此，$PS\parallel QP$，四邊形$PQRS$的一雙對邊平行而且相等，所以此四邊形是平行四邊形。

❷




〔已知〕兩圓外切於$A$，$P$爲內公切線$AP$上之任一點，$PB$，$PC$爲過$P$向兩圓所作之切線，

〔求證〕$PB=PC$

〔證明〕$PA$，$PB$爲過圓外一點向同一圓所作之二切線 $\therefore PA=PB$，同樣 $PA=PC$ $\therefore PB=PC$

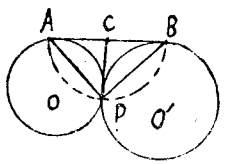
# 省立臺北第一女子中學
# 省立臺北第二女子中學 聯合招生
# 省立板橋中學(女子組)

一、選擇題

❶ (0) 〔註〕三角形三中線的交點叫做重心。 ❷ ② ❸ ① ❹ ③ ❺ (0) 〔註〕二圓的連心線等於半徑的和，則此二圓必外切。 ❻ (0)〔註〕直角三角形的一銳角等於他一銳角的兩倍，則短的直角邊等於斜邊的$\frac{1}{2}$。 ❼ ③ ❽ ① ❾ ④ ❿ (0) 〔註〕正多角形之一內角爲108°，則爲五邊形。 ⓫ ④ ⓬ ② ⓭ ① ⓮ ② ⓯ ② ⓰ ④ ⓱ ② ⓲ ④ ⓳ ④ ⓴ (0) 〔註〕每邊20公分的正三角形，其高等於$10\sqrt{3}$ ㉑ ② ㉒ ④ ㉓ ③ ㉔ (0) 〔註〕如果$a>0$, $b>0$則$\sqrt{a^2}+\sqrt{b^2}=a+b$, 但是沒有言明 $a,b$ 之符號時，則不能確定。 ㉕ (0) 〔註〕$a^0=1$ ㉖ ① ㉗ ④ ㉘ ② ㉙ ① ㉚ ① ㉛ ① ㉜ ② ㉝ (0) 〔註〕$3m^0\times(3m)^0=3$ ㉞ ④ ㉟ ④ ㊱ (0)〔註〕設 $a,b,c$ 三數成等差級數，則 $2b=a+c$ ㊲ ① ㊳ ① ㊴ (0) 〔註〕解 $x+\sqrt{3x-14}=6$ 則 $x=5$ ㊵ ③ ㊶ ② ㊷ ③ ㊸ ③ ㊹ ③ ㊺ ④ ㊻ ③ ㊼ ① ㊽ ③ 〔註〕35公斗−5公斗=30公斗 5公斗−3公斗=2公斗 30公斗÷2公斗≒15 15+1=16 ㊾ ② ㊿ ②

二、演算題：

❶

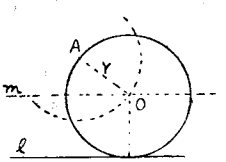



〔已知〕 二圓 $O,O'$ 外切於 $P$, $AB$ 爲一外公切線

〔求證〕 $\angle APB=\angle R$

〔證明〕 作內公切線 $PC$, 交 $AB$ 於 $C$, 則 $CA=CP$, $CB=CP$ $\therefore CA=CB=CP$ 故以 $C$ 爲圓心，$CP$ 爲半徑作圓時必通過三點 $A,P,B$, 而 $AB$ 爲此圓之直徑 $\therefore \angle APB=\angle R$

❷



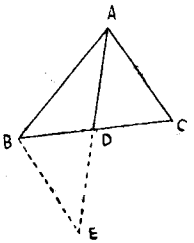

〔題意〕 求作一圓 $O$, 過一已知點 $A$, 切一已知直線 $l$, 且半徑有定長 $\Upsilon$。

〔解析〕 設適合條件之圓 $O$ 已經作成，連結 $OA$, 作 $OB\perp l$, 則 $OA=\Upsilon$, $OB=\Upsilon$, 故 $O$ 在以 $A$ 爲圓心，$\Upsilon$ 爲半徑之圓上，同時在平行於 $l$, 而與 $l$, 相距 $\Upsilon$ 之直線 $m$ 上。

〔作圖〕 以 $A$ 爲圓心，$\Upsilon$ 爲半徑，作圓 $A$, 又作平行於 $l$, 而與 $l$ 有 $\Upsilon$ 之距離之直線 $m$, 圓 $A$ 及直線 $m$ 之一交點爲 $O$, 以 $O$ 爲圓心 $\Upsilon$ 爲半徑作圓。

〔證明〕 連結 $OA$, 又作 $OB\perp l$, 依作圖知 $OA=\Upsilon$, $OB=l$, 故以 $O$ 爲圓心，$\Upsilon$ 爲半徑之圓，必通過 $A$, 而切於 $l$, 且其半徑有定長 $\Upsilon$。

〔討論〕 圓 $A$ 與直線 $l$ 相交時有二解，相切時有一解，否則無解。

❸ 


〔已知〕 $AD$ 爲 $\triangle ABC$ 之中線

〔求證〕 $AD<\frac{1}{2}(AB+AC)$

〔證明〕 延長 $AD$ 至 $E$, 使 $AD=DE$, 連結 $BE$, 則

$$\left.\begin{matrix}AD=DE\\DC=BD\\\angle ADC=\angle BDE\end{matrix}\right\}\therefore\triangle ADC\cong\triangle BDE$$

$\therefore AC=BE$.

於 $\triangle ABE$, $AE<AB+BE$,

$\therefore 2AD<AB+AC$ 即 $AD<\frac{1}{2}(AB+AC)$

❹ 正方形之面積爲 $a^2$, 四個四分圓之面積和爲 $\pi\left(\frac{a}{2}\right)^2=\frac{\pi a^2}{4}$, 故四個弧所圍成的面積是 $a^2-\frac{\pi a^2}{4}=(1-\frac{\pi}{4})a^2$ 答 $(1-\frac{\pi}{4})a^2$

❺ 以 $x$, $x+2$ 表示這兩數, 依題意得方程式 $(x+2)^2-x(x+2)=38$,
解之, $x^2+4x+4-x^2-2x-38=0$ $2x-34=0$ $2x=34$ $\therefore x=17$
$x+2=19$ 答: 17, 19

❻ $\begin{cases}x+y=5\cdots\cdots①\\x^2+y^2=13\cdots\cdots②\end{cases}$ 把②改成 $(x+y)^2-2xy=13$, 把①代入去,
$25-2xy=13$ 即 $xy=6$ ③ 解 ①, ③ 得 $x=2$, $y=3$ 及 $x=3$, $y=2$

答: $\begin{cases}x=2\\y=3\end{cases}$ $\begin{cases}x=3\\y=2\end{cases}$

❼ $p+q:p-q=m+n:m-n$ 依合分比之理得 $[(p+q)+(p-q)]:[(p+q)-(p-q)]=[(m+n)+(m-n)]:[(m+n)-(m-n)]$
即 $2p:2q=2m:2n$ $\therefore p:q=m:n$

❽ 設第 $n$ 項是77, 則 $9+(13-9)(n-1)=77$ $4(n-1)=68$ $n-1=17$
$n=18$ 答: 第18項

❾ 設所需的日數爲 $x$, 依題意作方程式 $\frac{x-2}{8}+\frac{x}{12}=1$
解之, $3(x-2)+2x=24$ $3x-6+2x=24$ $5x=30$ $\therefore x=6$
答: 6日

❿ 設這段布的長爲 $x$ 公尺, 依題意得方程式
$\frac{x}{2.8}-\frac{x}{3.5}=4$ 解之, $5x-4x=56$ (兩邊乘14) $\therefore x=56$
答: 56公尺

## 省立臺北商業職業學校

I 是非題

❶× 〔註〕 $0.01\times12=0.12>0.1$ ❷× 〔註〕 $1\times0.7\times0.8=1\times0.8\times0.7$ ❸○
❹○ ❺× ❻× ❼○ ❽○ ❾○ ❿○

II 填充題

❶62.5% ❷5 ❸2 ❹1：1：$\sqrt{2}$ ❺17 ❻2 ❼$(1-x+y)^3$ ❽正 ❾$a-bi$ ❿$n-2$

Ⅱ 選擇題

❶〔一〕 ❷〔二〕 ❸〔三〕 ❹〔一〕 ❺〔二〕 ❻〔二〕 ❼〔三〕 ❽〔二〕 ❾〔三〕 ❿〔三〕

Ⅳ ❶ $2x+(a^2-4)x-2ax^2=2a+a^2x-4x-2ax^2=a(2+ax)-2x(2+ax)$

$=(2+ax)(a-2x)$ 答：$(2+ax)(a-2x)$

❷ $x^4+\frac{1}{64}=x^4+\frac{1}{4}x^2+\frac{1}{64}-\frac{1}{4}x^2=(x^2+\frac{1}{8})^2-(\frac{1}{2}x)^2$

$-(x^2+\frac{1}{8}+\frac{1}{2}x)\ (x^2+\frac{1}{8}-\frac{1}{2}x)=(x^2+\frac{1}{2}x+\frac{1}{8})$

$(x^2-\frac{1}{2}x+\frac{1}{8})$ 答：$(x^2+\frac{1}{2}x+\frac{1}{8})\ (x^2-\frac{1}{2}x+\frac{1}{8})$

Ⅴ 設其他二邊的長爲 $x$ 寸，$y$ 寸，則 $\begin{cases} x^2+y^2=20\cdots\cdots① \\ \frac{1}{2}xy=96\cdots\cdots② \end{cases}$ ①+②×4 得 $(x+y)^2=784$

因 $x+y>0$ ∴ $x+y=28$ ③ ①−②×4 得 $(x-y)^2=16$ ∴ $x-y=4$④

或 $x-y=-4$ ⑤ 解③、④ 得 $x=16$，$y=12$ 解③、⑤得 $x=12$，$y=16$

答： 12寸，16寸

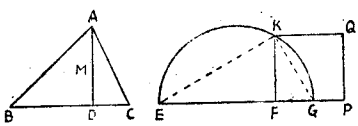
Ⅵ 設兒童爲 $x$ 人，依題意得方程式 $\frac{x\{2\times10+(x-1)\times5\}}{2}=100$ 解之，

$x(20+5x-5)==200$ $x(5x+15)=200$ $5x(x+3)=200$ $x(x+3)=40$

$x^2+3x-40=0$ $(x+8)(x-5)=0$ 因 $x+8>0$ ∴ $x-5=0$

∴ $x=5$ 答： 5人

Ⅶ




〔作圖〕 已知 $\triangle ABC$ 之底邊爲 $BC$，高爲 $AD$、$AD$ 之中點爲 $M$，則 $\triangle ABC=\frac{1}{2}AD\cdot BC=DM\cdot BC$ 作一線段 $EFG$，使 $EF=BC$，$FG=DM$，用 $EG$ 爲直徑作半圓 $EGK$，過 $F$，作 $FK$，垂直於 $EG$，交圓周於 $K$，然後用 $FK$ 爲一邊，作正方形 $KFPQ$，便合所求。

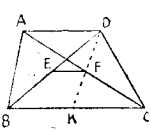
〔證明〕 聯結 $EK$、$GK$，於 $\triangle EFK$，$\triangle GFK$，$\angle EFK=\angle KFG$ $\angle FEK=90°-\angle EKF=\angle EKG-\angle EKF=\angle EKG$ ∴ $\triangle EFK\backsim\triangle GFK$

∴ $EF:FK=FK:FG$ ∴ $\overline{FK}^2=FG\cdot EF$，正方形$KFPQ=\overline{FK}^2$

$\triangle ABC=DM\cdot BC=FG\cdot EF$ ∴ 正方形$KFPQ=\triangle ABC$

〔討論〕 無論 $\triangle ABC$ 之形狀如何恒有一個解答。

Ⅷ




〔已知〕 梯形 $ABCD$ $(AD/\!/BC)$ 中， $DE=EB$，$AF=FC$

〔求證〕 $EF=\frac{1}{2}(BC-AD)$

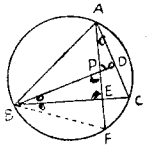
〔證明〕 聯結 $DF$，延長到 $K$，與 $BC$ 相交，於 $\triangle AFD$、$\triangle CFK$， $AF=FC$， $\angle AFD=\angle CFK$，

$\angle DAF=\angle KCF$ ∴ $\triangle AFD\equiv\triangle CFK$ ∴ $AD=KC$,

$DF=FK$, 於 $\triangle DBK$, $DE=EB$, $DF=FK$ ∴ $EF=\frac{1}{2}BK$

$BK=BC-KC=BC-AD$ ∴ $EF=\frac{1}{2}(BC-AD)$

Ⅸ




〔已知〕於 $\triangle ABC$, $P$ 爲垂心，$AP$ 與 $BC$ 的交點爲 $E$, 與外接圓的交點爲 $F$。

〔求證〕$PE=EF$

〔證明〕$BP$ 與 $AC$ 的交點爲 $D$, 比較 $\triangle BPE$, $\triangle APD$,

$\angle BPE=\angle APD$, $\angle BEP=ADP=\angle R$,

∴ $\angle PBE=\angle PAD$ 而 $\angle PAD=\angle FBE$

∴ $\angle PBE=\angle FBE$ 又 $BE$ 爲共通， $\angle PEB=\angle FEB=\angle R$

∴ $\triangle PBE\equiv\triangle FBE$ ∴ $PE=EF$

Ⅹ $(25人+35人)\div(1-\frac{1}{8}-\frac{4}{5})=60人\div(1-\frac{5}{40}-\frac{32}{40})=60人\div\frac{3}{40}$

$=60人\times\frac{40}{3}=800人$……投考生數 答： 投考生800人

## 臺北市私立靜修女子中學

一 算術部份

❶ $\dfrac{1-\frac{1}{2}}{1-\frac{1}{1+\frac{1}{2}}}=\dfrac{\frac{1}{2}}{1-\frac{2}{2+1}}=\dfrac{\frac{1}{2}}{1-\frac{2}{3}}=\dfrac{\frac{1}{2}}{\frac{1}{3}}=\frac{3}{2}=1\frac{1}{2}$

答：$1\frac{1}{2}$

❷ 7册−5册=2册 13册+5册=18册 18册÷2册=9 9+1=10

答：甲工作9小時，乙工作10小時

二 代數部份

❶ $0.5x+0.6x-0.8=0.75x+0.25$ $50x+60x+80=75x+25$

$110x-75x=25+80$ $35x=105$ ∴ $x=3$ 答：$x=3$

❷ $2s=9+12+15=36$ $s=18$ $s-a=18-9=9$ $s-b=18-12=6$

$s-c=18-15=3$ ∴$\sqrt{s(s-a)(s-b)(s-c)}=\sqrt{18\times9\times6\times3}$

$=\sqrt{9\times2\times9\times6\times3}=\sqrt{9^2\times6^2}=9\times6=54$ 答：54

❸ $\dfrac{3\sqrt{2}+2\sqrt{5}i}{3\sqrt{2}-2\sqrt{5}i}=\dfrac{(3\sqrt{2}+2\sqrt{5}i)^2}{(3\sqrt{2}-2\sqrt{5}i)(3\sqrt{2}+2\sqrt{5}i)}$

$=\dfrac{(3\sqrt{2})^2+(2\sqrt{5}i)^2+2(3\sqrt{2})(2\sqrt{5}i)}{(3\sqrt{2})^2-(2\sqrt{5}i)^2}=\dfrac{18-20+12\sqrt{10}i}{18+20}$

$$=\frac{-2+12\sqrt{10}i}{38}=\frac{6\sqrt{10}i-1}{19}$$ 答：$\frac{6\sqrt{10}i-1}{19}$

❶ 設首項爲$a$，公差爲$d$，則 $\begin{cases}(a+d)+(a+2d)=19 & ①\\(a+4d)+(b+6d)=40 & ③\end{cases}$

②－①得 $7d=21$ $\therefore d=3$ 代入① $2a+9=19$ $2a=10$ $\therefore a=5$ 答：5

❷ 設上山需$x$小時，下車需$y$小時，則 $\begin{cases}15x+30y=210 & ①\\x+y=10 & ②\end{cases}$

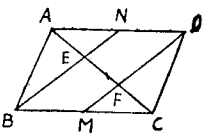
由①得 $x+2y=14$ ③ ③－②得 $y=4$ 代入③得$x=6$

答：上山6小時，下山4小時

三 幾何部份

❶ 〔已知〕於平行四邊形$ABCD$，$AN=ND$，$BM=MC$，$BN$，$DM$與$AC$之交點分別爲$E,F$，

〔試證〕$AE=EF=FC$




〔證明〕$ABCD$爲□，$\therefore AD\parallel BC$，而$ND=\frac{1}{2}AD$，

$BM=\frac{1}{2}BC$ $\therefore ND\parallel BM$ 由是

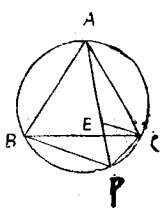
$BMDN$亦爲□，$\therefore BN\parallel MD$，

於$\triangle AFD$，$AN=DN$，$NE\parallel DF$ $\therefore AE=EF$……①

於$\triangle BEC$，$BM=MC$，$BE\parallel MF$ $\therefore EF=FC$……②

因此，由 ① ② 得 $AE=EF=CF$

❷



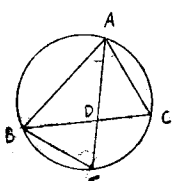

〔已知〕$\triangle ABC$爲圓內接正三角形，$P$爲$\overset{\frown}{BC}$上之任意點

〔求證〕$PA=PB+PC$

〔證明〕在$PA$上取一點$E$，使$PE=PC$，則$\triangle PEC$亦爲正三角形（因爲$PE=PC$，而$\angle CPE=\angle CBA=60°$）$\therefore PC=EC$ 比較$\triangle PBC$和$\triangle EAC$，$BC=AC$，$PC$ $EC$，$\angle PCB=\angle ECA$

（$\angle PCB=\angle PCE-\angle BCE=60°-\angle BCE=\angle BCA-\angle BCE=ECA$）$\therefore \triangle PBC\cong\triangle EAC$ $\therefore PB=EA$ 因此$PB+PC=EA+PE=PA$ $\therefore PA=PB+PC$

❸




〔已知〕$\angle BAE=\angle CAE$

〔求證〕$AB\cdot AC=AD\cdot AE$

〔證明〕聯結$BE$，於$\triangle ABE$，$\triangle ADC$，

$\angle BAE=\angle CAE$ $\angle AEB=\angle ACB$

$\therefore \triangle ABE\sim\triangle ADC$，$\therefore AB:AD=AE:AC$

$\therefore AB\cdot AC=AD\cdot AE$

## 臺北市私立開南商工職業學校

一、設此二數爲 $18a$, $18b$, 則 $a$, $b$ 爲互質數，因此二數之乘積爲 1944, 故 $18a\times 18b=1944$ 兩邊以 $18\times 18$ 除之得 $ab=6$, 把 6分解爲二個互質數之數的乘積得 $2\times 3$, $1\times 6$, 因此，所求之二數爲 $18\times 2=36$, $18\times 3=54$ 或 $18\times 1=18$, $18\times 6=108$ 答： 36，54 或 18，108

二、❶ $25a^2-(2a-3b)^2=(5a)^2-(2a-3b)^2=[5a+(2a-3b)][5a-(2a-3b)]$
$=(5a+2a-3b)(5a-2a+3b)=(7a-3b)(3a+3b)=3(a+b)(7a-3b)$

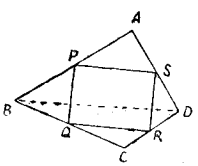
❷ $a^2+b^2+c^2+2ab+2bc+2ca=(a^2+2ab+b^2)+(2bc+2ca)+c^2$
$=(a+b)^2+2(a+b)c+c^2=(a+b+c)^2$

答： ❶ $3(a+b)(7a-3b)$ ❷ $(a+b+c)^2$

三、因 $mx^2-2x+3$ 可以 $x-3$ 除盡， 故由因數定理 得 $3^2m-2\times 3+3=0$，解之， $9m-6+3=0$ $9m=6-3$ $9m=3$ $\therefore m=\frac{1}{3}$

答： $m=\frac{1}{3}$

四、

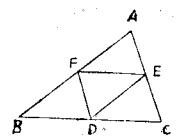



〔已知〕 四邊形 $ABCD$ 中， $AP=PB$， $BQ=QC$， $CR=RD$ $DS=SA$

〔求證〕 四邊形 $PQRS$ 是平行四邊形

〔證明〕 聯結 $BD$， 於 $\triangle ABD$， $AP=PB$， $AS=SD$ $\therefore PS\parallel\frac{1}{2}BD$， 同樣可證 $QR\parallel\frac{1}{2}BD$ $\therefore PS\parallel QR$， 故四邊形 $PQRS$ 是平行四邊形

五、




〔已知〕 $\triangle ABC$ 中， $AF=FB$， $BD=DC$， $CE=EA$

〔求證〕 $\triangle AEF\equiv\triangle BDF\equiv\triangle CED\equiv\triangle DEF$

〔證〕 於 $\triangle ABC$， $AF=FB$， $AE=EC$， $\therefore FE/\!/BD$ 同樣可證 $BF/\!/DE$， 故四邊形 $BDEF$ 爲平行四邊形 $\therefore \triangle BDF\equiv\triangle DEF$， 同樣可證 $\triangle CED\equiv\triangle DEF$， $\triangle AFE\equiv\triangle DEF$，因此， $\triangle AFE\equiv\triangle BDF\equiv\triangle CED\equiv\triangle DEF$

## 省立基隆中學

I 填充

❶ $c+d:c-d$ ❷ $-6$ 〔註〕 $\sqrt{-4}\times\sqrt{-9}=2i\times 3i=6i^2=-6$

❸ $3ab\sqrt{3ac}$, $2xy^2\sqrt{2x^2}$ ❹ 等差 ❺ $\frac{1}{3}-\frac{1}{3}$ ❻ 三邊之中垂線，三頂點 ❼ 內角平分線 ❽ 小於 ❾ $AB$ ❿ 相等，相等，相等且平行，互相平分

**I** 選擇

❶ ③ ❷ ① ❸ ③ ❶ ③ ❺ ③ ❻ ② ❼ ① ❽ ② ❾ ① ❿ ③

〔註〕循環小數一定可以化做分數，所以是有理數。

**II** ❶ $a^2+b^2+C^2-2ab+2ac-2bc=(a^2+2ac+c^2)-(2ab+2bc)+b^2$

$=(a+c)^2-2b(a+c)+b^2=(a+c-b)^2$

❷ $x^4+x^2y^2+y^4=x^4+2x^2y^2+y^4-x^2y^2=(x^2+y^2)^2-(xy)^2$

$=(x^2+y^2+xy)(x^2+y^2-xy)=(x^2+xy+y^2)(x^2-xy+y^2)$

答：❶ $(a+c-b)^2$ ❷ $(x^2+xy+y^2)(x^2-xy+y^2)$

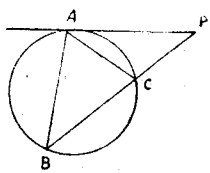
**III** $ax^2+bx+c=0(a$ 應該不是0,) $x^2+\frac{b}{a}x+\frac{c}{a}=0$ $x^2+\frac{b}{a}x=-\frac{c}{a}$

$x^2+\frac{b}{a}x+\left(\frac{b}{2a}\right)^2=\left(\frac{b}{2a}\right)^2-\frac{c}{a}$ $\left(x+\frac{b}{2a}\right)^2=\frac{b^2-4ac}{4a^2}$

$x+\frac{b}{2a}=\frac{\pm\sqrt{b^2-4ac}}{2a}$ $\therefore x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

答：$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

**IV**




〔已知〕 $PA$是切線，$PBC$是割線

〔求證〕 $\overline{PA}^2=PB\cdot PC$

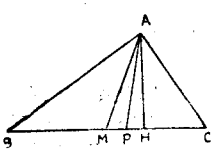
〔證明〕 於 $\triangle PAB$, $\triangle PCA$ $\angle PAB=\angle PCB$

$\angle P$ 爲共通 $\therefore \triangle PAB\backsim\triangle PCA$

$\therefore PB:PA=PA:PC$

$\therefore \overline{PA}^2=PB\cdot PC$

**V**




〔已知〕 於 $\triangle ABC$, $\angle BAC=\angle R$, $AH\perp BC$, $BM=MC$, $\angle BAP=\angle CAP$

〔求證〕 $\angle MAP=\angle HAP$

〔證明〕 $\angle BAP=\angle CAP$……(1) $M$爲直角$\triangle ABC$之斜邊$BC$之中點，$\therefore BM=AM$

$\therefore \angle BAM=\angle B$, $\angle BAC=\angle AHC=\angle R$, $\therefore \angle B=\angle CAH$

因此，$\angle BAM=\angle CAH$……②， ①−②得 $\angle MAP=\angle HAP$

**VI** $\left(\frac{1}{8}+\frac{1}{12}\right)\times 4=\frac{1}{2}+\frac{1}{3}=\frac{3}{6}+\frac{2}{6}=\frac{5}{6}$ $1-\frac{5}{6}=\frac{1}{6}$

$\frac{1}{6}\div\frac{1}{12}=\frac{1}{6}\times 12=2$ 答：還需要2日

**VII** (24個−1個)×2=46個 (46個−1個)×2=90個 (90個−1個)×2=178個

答：原有178個

## 省立基隆女子中學

算術

**I** 是非題

❶ － ❷ ＋ ❸ － ❹ － ❺ －

Ⅰ 選擇題

❶ 1 ❷ 2 ❸ 3 ❹ 1 ❺ 1

Ⅱ 填充題

❶ 二千一百萬兩 ❷ $\frac{1}{3}$

Ⅲ 應用題

❶ 5分×2＝10分 $10分\div(1-\frac{1}{12})=10分\div\frac{11}{12}=10分\times\frac{12}{11}=\frac{120}{11}分$

$=10\frac{10}{11}分$ 答：2點$10\frac{10}{11}$分

❷ 5000元×0.05×3＝750元 答：三個月的利息是750元

代數

❶ ① $(x^2+4x)^2-2(x^2+4x)-15=(x^2+4x-5)(x^2+x+3)$

$=(x+5)(x-1)(x^2+x+3)$ 答：$(x+5)(x-1)(x^2+x+3)$

② $x^4-3x^2+1=x^4-2x^2+1-x^2=(x^2-1)^2-x^2=(x^2-1+x)(x^2-1-x)$

$=(x^2+x-1)(x^2-x-1)$ 答：$(x^2+x-1)(x^2-x-1)$

❷ ① $\sqrt{x+20}+\sqrt{x+4}=2\sqrt{x+11}$ 兩邊平方

$x+20+x+4+2\sqrt{(x+20)(x+4)}=4(x+11)$ $2\sqrt{(x+20)(x+4)}$

$=2x+20$ $\sqrt{(x+20)(x+4)}=x+10$ 兩邊再平方 $(x+20)(x+4)$

$=(x+10)^2$ $x^2+24x+80=x^2+20x+100$ $4x=20$ $\therefore x=5$

驗算後知可適合原方程式 答：$x=5$

② $\sqrt{x+7-\sqrt{5(x-2)}}=3$ 兩邊平方 $x+7-\sqrt{5(x-2)}=9$

$x-2+\sqrt{5(x-2)}$ 兩邊再平方 $x^2-4x+4=5x-10$ $x^2-9x+14=0$

$(x-2)(x-7)=0$ $\therefore x=2$或7 $x=2$時 $\sqrt{x+7-\sqrt{5(x-2)}}$

$=\sqrt{2+7-\sqrt{0}}=\sqrt{9}=3$可適合 $x=7$時 $\sqrt{x+7-\sqrt{5(x-2)}}$

$=\sqrt{7+7-\sqrt{25}}=\sqrt{14-5}=\sqrt{9}=3$ 也可適合

答：$x=2,7$

③ 以$-6$，$-\frac{1}{3}$爲根的一元二次方程式是 $(x+6)(x+\frac{1}{3})=0$

$(x+6)(3x+1)=0$ $3x^2+19x+6=0$ 答：$3x^2+19x+6=0$

④

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 64 | 192 | 240 | 160 | 60 | 12 | 1 | 8 | 12 | 6 | 1 |
| 64 | | | | | | | 8 | | | |
| | 192 | 240 | | | | | 8 | | | |
| | 192 | 144 | | | | | 16 | 12 | | |
| | | 96 | 160 | 60 | | | | 12 | | |
| | | 96 | 144 | 36 | | | 16 | 24 | 6 | |
| | | | 16 | 24 | 12 | 1 | | | 6 | |
| | | | 16 | 24 | 12 | 1 | 16 | 24 | 12 | 1 |
| | | | | | | 0 | | | | 1 |

，

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8 | 12 | 6 | 1 | 2 | | 1 | |
| 8 | | | | 12 | | | 6 1 |
| | 12 | 6 | 1 | | 6 | 1 | 1 |
| | 12 | 6 | 1 | 12 | 6 | 1 | |
| | | | 0 | | | | |

答：$2x+1$

⑤ $\begin{cases} x^2-4y^2=9 & ① \\ xy++2y^2=3 & ② \end{cases}$ ①−②×3 $x^2-3xy-10y^2=0$

$(x-5y)(x+2y)=0$

$\therefore x=5y$ ③或 $x=-2y$ ④ ③代入① $25y^2-4y^2=9$

$21y^2=9$ $y^2=\frac{9}{21}=\frac{3}{7}$ $\therefore y=\pm\sqrt{\frac{3}{7}}=\pm\frac{\sqrt{21}}{7}$

代入 ③ $x=\pm\frac{5\sqrt{21}}{7}$ ④ 代入① $4y^2-4y^2=9$ $0=9$ 不合理 故捨去

答：$x=\pm\frac{5\sqrt{21}}{7}$ $y=\pm\frac{\sqrt{21}}{7}$

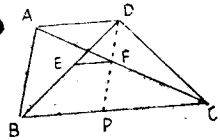
⑥ 設這兩數爲 $x$, $y$, 依題意得方程式 $\begin{cases} x+y=99 & ① \\ x-y=45 & ② \end{cases}$

① +② $2x=144$ $\therefore x=72$ 代入①得 $72+x=99$ $\therefore y=27$

答：7，2

## 幾何

❶




〔已知〕 二$ABCD$是梯形 $(AD/\!/BC)$

$BE=ED$, $CF=FA$

〔求證〕 $EF=\frac{1}{2}(BC-AD)$

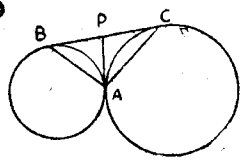
〔證明〕 聯結$DF$，延長到$P$，與$BC$相交，

則 $CF=FA$, $\angle CFP=\angle AFD$, $\angle ECP=\angle FAD$ $\therefore \triangle CFP\cong\triangle AFD$

$\therefore PF=FD$, $PC=AD$, 於 $\triangle DBP$, $BE=ED$, $PF=FD$

$\therefore EF=\frac{1}{2}BP$ 而 $BP=BC-PC=BC-AD$ $\therefore EF=\frac{1}{2}(BC-AD)$

❷




〔已知〕 二圓外切於$A$, $AP$爲內公切線，$BC$爲一外公切線

〔求證〕 $\angle BAC=\angle R$

〔證明〕 $PA=PB$ $\therefore \angle PAB=\angle PBA$,

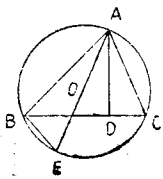
$PA=PC$ $\therefore \angle PAC=\angle PCA$

$\therefore \angle BAC=\angle PAB+\angle PAC$

$=\angle PBA+\angle PCA$ 而且 $\angle BAC+\angle PBA+\angle PCA=2\angle R$

$\therefore \angle BAC=\angle R$

❸




〔已知〕 在$\triangle ABC$中，$O$爲外接圓中心，$AD\perp BC$

〔求證〕 $AB\cdot AC=AD\cdot AE$

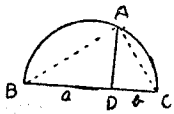
〔證明〕 連結$BE$, 於$\triangle ABE$, $\triangle ADC$

$\angle ABE=\angle ADC=\angle R$ $\angle AEB=\angle ACD$

$\therefore \triangle ABE\backsim\triangle ADC$ $\therefore AB:AD=AE:AC$

$\therefore AB\cdot AC=AD\cdot AE$

❹




〔作圖〕 已知二線段爲 $a$, $b$.
作 $BD=a$, 延長 $BD$ 到 $C$, 使 $DC=b$, 用 $BC$ 做直徑作半圓, 過 $D$, 作 $DA$, 垂直於 $BC$, 與半圓相交於 $A$, 則 $DA$ 就是 $a$, $b$ 的比例中項

〔證明〕 聯結 $AB$, $AC$, 則 $\angle BAC=\angle R$, $AD\perp BC$,

$$\therefore \overline{AD}^2=BD\cdot DC=ab$$

〔討論〕 無論 $a$, $b$ 之長如何恒有一解

❺ $1\text{方呎}\times 1^2\times\pi\times\frac{60}{360}=\frac{\pi}{6}\text{方呎}$……扇形的面積

$1\text{方呎}\times 1\times\frac{\sqrt{3}}{2}\times\frac{1}{2}=\frac{\sqrt{3}}{4}\text{方呎}$……三角形的面積

$\frac{\pi}{6}\text{方呎}-\frac{\sqrt{3}}{4}\text{方呎}=\frac{2\pi-3\sqrt{3}}{12}\text{方呎}$……弓形的面積

答：$\frac{2\pi-3\sqrt{3}}{12}$方呎

## 省立基隆水產職業學校

一、是非法

❶− ❷− ❸−〔註〕$x^0=1$ ❹+ ❺− ❻− ❼+ ❽−

二、填充法

❶ $x^3+3x^2y+3xy^2+y^3$ ❷ 最簡分式，既約分式 ❸ 複比

❹ 直徑 ❺ $S.S.S.$ ❻ 三內角平分線的交點 ❼ 分子的立方根，分母的立方根 ❽ 按分

三、選擇法

❶ 三個 ❷ 逆定理 ❸ $\sqrt{-1}$ ❹ 零

四、問答

❶ $\begin{cases}5x-2y=5\cdots\cdots①\\3x+7y=85\cdots\cdots②\end{cases}$ ①×3−②×5 $-41y=-410$ $\therefore y=10$

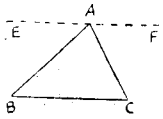
代入① $5x-20=5$ $5x=25$ $\therefore x=5$

答： $x=5$, $y=10$

❷

$$\begin{array}{r|l}
x^4+4x^3+10x^2+12x+9 & x^2+2x+3\\
\hline
x^4 & x^2\\
\hline
4x^3+10x^2 & x^2\\
4x^3+4x^2 & \hline\\
\hline
6x^2+12x+9 & 2x^2+2x\\
6x^2+12x+9 & 2x\\
\hline
0 & 4x^2+4x+3\\
 & 3\\
 & \hline
\end{array}$$

答： $\pm(x^2+2x+3)$

❽ 

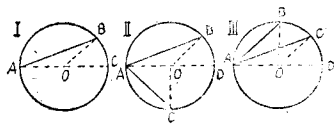

〔已知〕 $ABC$ 是三角形

〔求證〕 $\angle A+\angle B+\angle C=2\angle R$

〔證明〕 過 $A$, 作 $EF$ 與 $BC$ 平行， 則

$\angle B=\angle EAB$, $\angle C=\angle FAC$

$\therefore$ $\angle A+\angle B+\angle C=\angle BAC+\angle EAB+\angle FAC=$平角$EAF=2\angle R$

❾ 


〔已知〕 $\angle BAC$ 是圓 $O$ 內對弧 $BC$ 的圓周角。

〔求證〕 $\angle BAC$ 的度數$=\frac{1}{2}$弧 $BC$ 的度數。

〔證明〕 I 連結 $OB$, 於 $\triangle OAB$, $OA=OB$, $\therefore$ $\angle A=\angle B$

$\therefore$ $\angle BOC=\angle A+\angle B=\angle A+\angle A=2\angle A$

即 $\angle A=\frac{1}{2}\angle BOC$ $\angle BOC$ 的度數$=$弧 $BC$ 的度數

$\therefore$ $\angle A$ 的度數$=\frac{1}{2}$弧 $BC$ 的度數

II 過 $A$ 作直徑 $AD$, $\angle BAD$ 的度數$=\frac{1}{2}$弧 $BD$ 的度數

$\angle DAC$ 的度數$=\frac{1}{2}$弧 $DC$ 的度數

$\therefore$ $(\angle BAD+\angle DAC)$ 的度數$=\frac{1}{2}$(弧$BD$+弧$DC$)的度數即 $\angle BAC$ 的度數$=\frac{1}{2}$弧 $BC$ 的度數

III 過 $A$ 作直徑 $AD$ $\angle BAD$ 的度數$=\frac{1}{2}$弧 $BD$的度數

$\angle CAD$ 的度數$=\frac{1}{2}$弧 $CD$ 的度數

$\therefore$ $(\angle BAD-\angle CAD)$的度數$=\frac{1}{2}$(弧$BD$−弧$CD$)的度數

即 $\angle BAC$ 的度數$=\frac{1}{2}$弧 $BC$ 的度數

❺ 〔已知〕 在直角 $\triangle ABC$ 內 $BCDE$ 是弦上的正方形，$ABFG$, $ACHK$是兩股上的正方形。

〔求證〕 $\square BCDE=\square ABFG+\square ACHK$

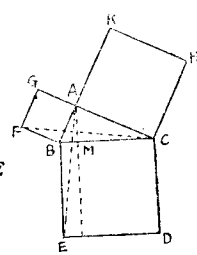
〔證明〕 $\angle BAC+\angle BAG=\angle R+\angle R=2R$,

所以 $GAC$ 是一直線，同樣 $BAK$ 也是一直線 在 $\triangle BFC$ 及 $\triangle BAE$,

$BF=BA$
$BC=BE$
$\angle FBC=\angle ABE$ $\Big\}\therefore \triangle BFC\equiv\triangle BAE$

但 $2\triangle BFC=\square ABFG$

$2\triangle BAE=\square BENM$ (同底等高)



因此，$\square ABFG=\square BENM$ 同樣可證 $\square ACHK=\square MNDC$

$\therefore\ \square ABFG+\square ACHK=\square BENM+\square MNDC=\square BEDC$

## 省立宜蘭中學

一、❶ $\dfrac{x^4+x^2+1}{x^2-x+1}=\dfrac{x^4+2x^2+1-x^2}{x^2-x+1}=\dfrac{(x^2+1)^2-x^2}{x^2-x+1}=\dfrac{(x^2+1+x)(x^2+1-x)}{x^2-x+1}$

$=x^2+x+1$

❷ $\dfrac{x^3-1}{x-1}=\dfrac{(x-1)(x^2+x+1)}{x-1}=x^2+x+1$

答：❶ $x^2+x+1$ ❷ $x^2+x+1$

二、假定子的現年爲$x$歲，則父的現年爲$3x$歲，依題意得方程式

$(x-4)+(3x-4)=60$

解之 $x-4+3x-4=60$ $4x=68$ $x=17$ 答：子現年17歲

三、$\begin{cases}x^2-y^2=8\cdots\cdots①\\ x^2-4xy+3y^2=0\cdots\cdots②\end{cases}$ 由②得 $(x-y)(x-3y)=0$

$\therefore\ x=y\cdots\cdots③$ 或 $x=3y\cdots\cdots④$

把③代入① 則 $y^2-y^2=8$ $0=8$ 不能成立，故捨去。把④代入① 得

$9y^2-y^2=8$ $8y^2=8$ $y^2=1$ $\therefore\ y=\pm1$ 再代入④ 得 $x=\pm3$

答：$\begin{cases}x=3\\ y=1\end{cases}$ $\begin{cases}x=-3\\ y=-1\end{cases}$

四、❶ $x^2-x+\dfrac{1}{4}=(x-\dfrac{1}{2})^2$ ❷ $x^3+8=x^3+2^3=(x+2)(x^2-2x+4)$

❸ $6x^2-7x-20=(2x-5)(3x+4)$

答：❶ $(x-\dfrac{1}{2})^2$ ❷ $(x+2)(x^2-2x+4)$ ❸ $(2x-5)(3x+4)$

五、❶ $\sqrt{3}(\sqrt{a}+\sqrt{b})=3a+\sqrt{3ab}$

❷ $\sqrt{-8}+\sqrt{-18}-\sqrt{-50}=\sqrt{4(-2)}+\sqrt{9(-2)}-\sqrt{25(-2)}$

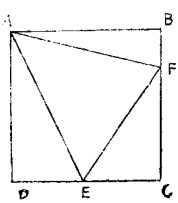
$=2\sqrt{-2}+3\sqrt{-2}-5\sqrt{-2}=0$

答：❶ $3a+\sqrt{3ab}$ ❷ 0

六、 $3+5+7=15$ $300\div15=24$ $24\times3=72$ $24\times5=120$ $24\times7=168$

答：72, 120, 168,

七、




〔題意〕 $ABCD$ 爲正方形 $AB=40$ 公寸，$DE=EC$，$BF=10$公寸，求 $\triangle AEF$ 的面積

〔解〕 $DE=EC=40$公寸$\div2=20$公寸

$CF=CB-BF=40$公寸$-10$公寸$=30$公寸

現在以 1 平方公寸爲面積的單位，來計算 $\triangle AEF$ 的面積。

$40\times40=1600$……正方形$ABCD$的面積

$40\times20\div2=400$……$\triangle ADE$的面積

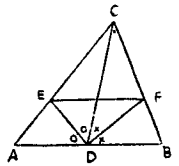
$20\times30\div2=300$……$\triangle CEF$的面積

$40\times10\div2=200$……$\triangle ABF$的面積

$1600-(400+500+200)=700$……$\triangle AEF$的面積

答：$\triangle AEF$的面積是700平方公寸

八、




〔已知〕 $CD$爲$\triangle ABC$之中線，$DE$平分$\angle CDA$，$DF$平分$\angle CDB$，

〔求證〕 $EF/\!/AB$

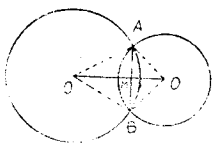
〔證明〕 於$\triangle ADC$，$\angle ADE=\angle CDE$

$\therefore AD:DC=AE:EC$ 又於$\triangle BDC$，$\angle BDF=\angle CDF$ $\therefore BD:DC=BF:FC$

已知$AD=BD$ $\therefore AD:DC=BD:DC$

$\therefore AE:EC=BF:FC$ 因此，$EF/\!/AB$

九、



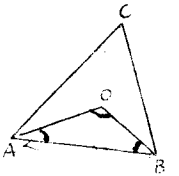

〔已知〕 兩圓$O,O'$相交於$A,B$

〔求證〕 $OO'$垂直平分$AB$.

〔證明〕 作半徑$OA$，$OB$，$O'A$，$O'B$，於$\triangle AOO'$，$\triangle BOO'$，已知 $AO=BO$，$AO'=BO'$，$OO'$爲共通 $\therefore \triangle AOO'\equiv\triangle BOO'$

$\therefore \triangle AOO'=BOO'$，$\triangle OAB$是等腰三角形，$OO'$是頂角$AOB$的分角線，故必垂直平分底邊$AB$。

十、




〔已知〕 於$\triangle ABC$，$\angle BAO=\angle CAO$，$\angle ABO=\angle CBO$

〔求證〕 $\angle AOB=90°+\frac{\angle C}{2}$

〔證〕 $\angle AOB=180°-(\angle BAO+\angle ABO)$

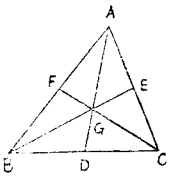
$=180°-(\frac{1}{2}\angle BAC+\frac{1}{2}\angle ABC)$

$=90°+90°-(\frac{1}{2}\angle BAC+\frac{1}{2}\angle ABC)$

$=90°+\frac{1}{2}\angle BAC+\frac{1}{2}\angle ABC+\frac{1}{2}\angle C-(\frac{1}{2}\angle BAC+\frac{1}{2}\angle ABC)$

$=90°+\frac{\angle C}{2}$

十一、




〔已知〕 $AD,BE,CF$爲$\triangle ABC$之三中線

〔求證〕 $AD+BE+CF>\frac{1}{2}(AB+BC+CA)$

〔證明〕 設三中線$AD$，$BE$，$CF$之交點爲$G$(重心)

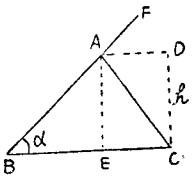
$BG+CG>BC$ 而且 $BE>BG$，$CF>CG$

$\therefore BE+CF>BC$ ①，同樣$AD+CF>CA$ ②，$AD+BE>AB$ ③，

①+②+③ 得 $2(AD+BE+CF)>AB+BC+CA$

即 $AD+BE+CF>\frac{1}{2}(AB+BC+CA)$

十二、




〔題意〕 已知三角形的底邊 $BC$ ($a$)，一底角 $B$ ($\angle$)，及底上之高 $AE$ ($h$)，求作 $\triangle ABC$。

〔作圖〕 作底邊 $BC$，使其長等於 $a$，過 $B$ 作直線 $BA$，使 $\angle CBF$ 等於 $\angle$，過 $C$，作 $BC$ 之垂線 $CD$，使其長等於 $h$，再過 $D$，引 $BC$ 之平行線 $DA$，交 $BF$ 於 $A$，連結 $AC$，即得適合題意之 $\triangle ABC$.

〔證明〕 由作圖知 $BC=a$，$\angle ABC=\angle$，高 $AE=DC=h$

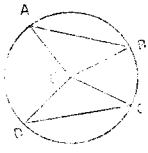
〔討論〕 $BC$ 之位置爲一定時，其上下各有一解。

## 省立蘭陽女子中學

一、❶ − ❷ − ❸ + ❹ − ❺ + ❻ + ❼ − ❽ + ❾ + ❿ +

二、❶ 等腰 ❷ 圓周角 ❸ 全相等(或全等) ❹ 對應邊的平方之比 ❺ 108度 ❻ $b^2+c^2-2cY$

三、

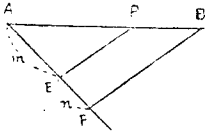



〔已知〕 $O$ 爲圓心，$\angle AOB=\angle COD$

〔試證〕 $AB=CD$

〔證明〕 於 $\triangle AOB$，$\triangle COD$，$AO=CO$，$BO=DO$，$\angle AOB=COD$ $\therefore\triangle AOB\equiv\triangle COD$ $\therefore AB=CD$

四、




〔題意〕 分已知線段 $AB$ 成二份，使其比等於其他二已知線段 $m$，$n$ 之比。

〔作圖〕 過 $A$，作任意直線 $AX$，在其上取二點 $E$，$F$，使 $AE=m$，$EF=n$，連結 $BF$，過 $E$，作直線 $EF$，平行於 $FB$，使其 $AB$ 交於 $P$。

〔證明〕 於 $\triangle AFB$，$EP/\!/FB$，$\therefore AP:PB=AE:EF=m:n$

〔討論〕 恒有一解

五、❶

$$\begin{array}{r|rrr} 2 & 24 & 20 & 16 \\ \hline 2 & 12 & 10 & 8 \\ \hline & 6 & 5 & 4 \end{array}$$

$2\times2=2$

答：2

❷

$$\begin{array}{r|r|r|l} 1 & 5688 & 4977 & 7 \\ & 4977 & 4977 & \\ \hline & 711 & 0 & \end{array}$$

答：711

六、❶ $\dfrac{1}{6}+\dfrac{3}{4}+\dfrac{1}{8}=\dfrac{4}{24}+\dfrac{18}{24}+\dfrac{3}{24}=\dfrac{25}{24}=1\dfrac{1}{24}$ 答：$1\dfrac{1}{24}$

❷ $b^3x^3y^2\div bxy^2=b^2x^2$ 答：$b^2x^2$

❸ $\dfrac{a}{m+n}\times\dfrac{m^2-n^2}{ay}=\dfrac{a}{m+n}\times\dfrac{(m+n)(m-n)}{ay}=\dfrac{m-n}{y}$ 答：$\dfrac{m-n}{y}$

❹ $(\sqrt{3}+\sqrt{2})^2=3+2\sqrt{6}+2=5+2\sqrt{6}$ 答：$5+2\sqrt{6}$

七、❶ $x^2-3x-10=0$ $(x-5)(x+2)=0$ $\therefore x=5,-2$ 答：$x=5,-2$

❷ $\begin{cases} x+y=5\cdots\cdots① \\ xy=6\cdots\cdots② \end{cases}$ 由①得 $y=5-x$ ③

③代入② $x(5-x)=6$ $5x-x^2=6$

$-x^2+5x-6=0$ $x^2-6x+5=0$ $(x-2)(x-3)=0$ $\therefore x=2, 3$ 代入③得

$y=3, 2$ $\begin{cases} x=2 \\ y=3 \end{cases}$ $\begin{cases} x=3 \\ y=2 \end{cases}$ 答：$\begin{cases} x=2 \\ y=3 \end{cases}$ $\begin{cases} x=3 \\ y=2 \end{cases}$

❸ $\sqrt{x+5}+3=6$ $\sqrt{x+5}=3$ 兩邊平方 $x+5=9$ $\therefore x=4$, 檢查後知可適合方程式。 答：$x=4$

❹ $\frac{\sqrt{x+9}}{\sqrt{y+2}}=\frac{4}{3}$ 兩邊平方 $\frac{x+9}{x+2}=\frac{16}{9}$ $16(x+2)=9(x+9)$

$16x+32=9x+81$ $7x=49$ $\therefore x=7$ 檢查後知可適合原方程式。

答：$x=7$

❺ 設此小孩之現年爲 $x$ 歲；則 $x+3=(x-3)^2$ $x+3=x^2-6x+9$ $-x^2+7x-6=0$ $x^2-7x+6=0$ $(x-1)(x-6)=0$ $x=1, 6$ $x=1$ 代入不適合題意 答：6歲

## 省立宜蘭農業職業學校

一、代 數

❶ $\begin{cases} y+z=14\cdots\cdots① \\ z+x=18\cdots\cdots② \\ x+y=24\cdots\cdots③ \end{cases}$ ①+②+③ $2(x+y+z)=56$ $x+y+z=28$ ④

④−① $x=14$ ④−② $y=10$ ④−③ $z=4$

答： $x=14$，$y=10$，$z=4$

❷ $\frac{x-1-\frac{2}{x}}{1-\frac{1}{x}-\frac{2}{x^2}}=\frac{x^2(x-1-\frac{2}{x})}{x^2(1-\frac{1}{x}-\frac{2}{x^2})}=\frac{x(x^2-x-2)}{x^2-x-2}=x$ 答：$x$

❸ $a^3+b^3+c^3-3abc=(a+b)(a^2-ab+b^2)+c^3-3abc=(a+b)[(a+b)^2-3ab]+c^3-3abc=(a+b)^3-3ab(a+b)+c^3-3abc=[(a+b)+c][(a+b)^2-(a+b)c+c^2]-3ab[(a+b)+c]=(a+b+c)(a^2+2ab+b^2-ac-bc+c^2-3ab)=(a+b+c)(a^2+b^2+c^2-ab-bc-ca)$

$\therefore$ $(a^3+b^3+c^3-3abc)\div(a+b+c)=a^2+b^2+c^2-ab-bc-ca$

答： $a^2+b^2+c^2-ab-bc-ca$

❹ 設甲數爲 $x$，乙數爲 $y$，則 $\begin{cases} x+y=100\cdots① \\ 2x+10=y\cdots\cdots② \end{cases}$ ②代入① $x+2x+10=100$

$3x=90$ $\therefore x=30$ 把此值代入② 得 $y=60+10=70$

答： $x=30$，$y=70$

❺ 設 $A$ 獨做 $x$ 日可成，$B$ 獨做 $y$ 日可成， 則

$\begin{cases} \frac{1}{x}+\frac{1}{y}=\frac{1}{6\frac{2}{3}}\cdots\cdots① \\ y=x+3\cdots\cdots② \end{cases}$ ②代入① $\frac{1}{x}+\frac{1}{x+3}=\frac{3}{20}$

$20(x+3)+20x=3x(x+3)$

$20x+60+20x=3x^2+9x$

$40x+60=3x^2+9x$　$3x^2-31x-60=0$　$(3x+5)(x-12)=0$　$x>0$

$\therefore\ 3x+5>0$　$\therefore\ x-12=0$，即 $x=12$　把此值代入② 得

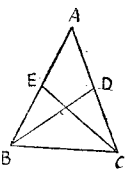
$y=12+3=15$　答：$A$獨做12日可成，$B$獨做15日可成

## 二、幾　何

❶ 設此多角形之邊數爲 $n$，則 $\frac{n(n-3)}{2}=135$，　$n(n-3)=270$

$n^2-3n-270=0$　$(n-18)(n+15)=0$　$n+15>0$　$\therefore\ n-18=0$

即 $n=18$　答：此多角形有18邊

❷ 

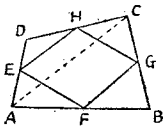

〔已知〕於 $\triangle ABC$, $AB=AC$, $AE=EB$, $AD=DC$

〔求證〕$BD=CE$

〔證明〕$AE=\frac{1}{2}AB$, $AD=\frac{1}{2}AC$ 而且 $AB=AC$

$\therefore\ AE=AD$, 於 $\triangle ABD$, $\triangle ACE$, $AD=AE$, $AB=AC$, $\angle A$爲共通，$\therefore\ \triangle ABD\equiv\triangle ACE$

$\therefore\ BD=CE$

❸ 


〔已知〕四邊形 $ABCD$ 中，$AF=FB$, $BG=GC$, $CH=HD$, $DE=EA$

〔求證〕四邊形 $GHEF$ 是平行四邊形

〔證明〕聯結$AC$, 於 $\triangle DAC$, $DE=EA$, $DH=HC$,

$\therefore\ EH/\!\!/\frac{1}{2}AC$, 同樣可證 $FG/\!\!/\frac{1}{2}AC$

$\therefore\ EH/\!\!/FG$, 故　四邊形 $GHEF$ 是平行四邊形

## 三、算　術

❶ $10000元\times(1+0.08)^3=10000元\times1.259712=12597.12元$……本利和

$12597.12元-10000元=2597.12元$……複利息

答：本利和12597.12元，　複利息2597.12元

❷ $0.\dot{4}5\div0.\dot{2}\dot{7}\times3.\dot{2}\dot{7}=\frac{45}{99}\div\frac{27}{99}\times3\frac{25}{90}=\frac{5}{11}\div\frac{3}{11}\times3\frac{5}{18}$

$=\frac{5}{\overset{1}{\cancel{11}}}\times\frac{\overset{1}{\cancel{11}}}{3}\times\frac{59}{18}=\frac{295}{54}=5\frac{25}{54}$　　答：$5\frac{25}{54}$

# 省立桃園中學

## 一、填充題：

❶ 兩者都是平行四邊形，前者四角都相等，後者四邊都相等。

❷ 同位角相等，內錯角相等　❸ $\frac{2n-4}{n}\angle R$　$\frac{4}{n}\angle R$

❹ 對角互爲補角　❺ ①對應各角相等，　②對應各邊的比相等

❻ ①把這五邊形變成等積的四邊形　②再把這四邊形變成等積的三角形

❼ 241〔註〕$(-7)^2-4\times6\times(-8)=49+192=241$，　不等的實數

❽ $l=a+(n-1)d$, $S=\dfrac{n\{2a+(n-1)d\}}{2}$ 或 $S=\dfrac{n(a+l)}{2}$

❾ 12 : 1　　❿ $C=\dfrac{5}{9}(F-32)$

二、解方程式：

❶ $\begin{cases}\dfrac{5}{x}-\dfrac{3}{y}-\dfrac{1}{2}=0\cdots\cdots① \\ \dfrac{6}{y}-\dfrac{1}{x}-\dfrac{4}{5}=0\cdots\cdots②\end{cases}$　①×2+② $\dfrac{9}{x}-\dfrac{9}{5}=0$　$\dfrac{9}{x}=\dfrac{9}{5}$

$x=5$　代入① $1-\dfrac{3}{y}-\dfrac{1}{2}=0$　$-\dfrac{3}{y}=-\dfrac{1}{2}$　$\therefore y=6$

答：$x=5$, $y=6$

❷ $\begin{cases}x^2+y^2-181=0\cdots① \\ x-y-1=0\cdots\cdots②\end{cases}$　由①得 $y=x-1$　③　③代入①

$x^2+(x-1)^2-181=0$　$x^2+x^2-2x+1-181=0$

$2x^2-2x-180=0$　$x^2-x-90=0$　$(x-10)(x+9)=0$

$\therefore x=10$或 $-9$　代入② 得 $y=9$ 或 $-10$　答：$\begin{cases}x=10 \\ y=9\end{cases}$ $\begin{cases}x=-9 \\ y=-10\end{cases}$

三、分解因式：

❶ $16x^4-y^4-(4x^2)^2-(y^2)^2=(4x^2-y^2)(4x^2+y^2)=(2x-y)(2x+y)(4x^2+y^2)$

答：$(2x-y)(2x+y)(4x^2+y^2)$

❷ $3x^2-21x+36=3(x^2-7x+12)=3(x-3)(x-4)$　答：$3(x-3)(x-4)$

❸ $x^3-y^6=x^3-(y^2)^3=(x-y^2)(x^2+xy^2+y^4)$

答：$(x-y^2)(x^2+xy^2+y^4)$

❹ $x^3y-8x^2y-20xy=xy(x^2-8x-20)=xy(x-10)(x+2)$

答：$xy(x-10)(x+2)$

❺ $10x^3-10y^3-30x^2y+30xy^2=10(x^3-3x^2y+3xy^2-y^3)=10(x-y)^3$

答：$10(x-y)^3$

四、計算下列各題

❶ $\dfrac{\sqrt{2xy}\times\sqrt[3]{4x^2y^2}}{\sqrt[4]{8x^3y^3}}=\dfrac{\sqrt[12]{64x^6y^6}\times\sqrt[12]{256x^8y^3}}{\sqrt[12]{512x^9y^9}}=\sqrt[12]{\dfrac{64x^6y^6\times256x^8y^3}{512x^9y^9}}$

$=\sqrt[12]{32x^5y^5}$　答：$\sqrt[12]{32x^5y^5}$

❷ $\dfrac{1+\sqrt{-1}}{1-\sqrt{-1}}=\dfrac{1+i}{1-i}=\dfrac{(1+i)^2}{(1-i)(1+i)}=\dfrac{1+2i+i^2}{1-i^2}=\dfrac{1+2i-1}{1+1}=\dfrac{2i}{2}=i$

答：$i$

❸ 設此等腰直角三角形的腰爲 $x$ 公分，則 $x^2+x^2=(30\sqrt{2})^2$

$2x^2=2\times30^2$　$x^2=30^2$　$\therefore x=30$,　故此三角形之面積爲

$\dfrac{1}{2}x^2=\dfrac{1}{2}\times30^2=450$　答：450方公分

❹ 高與下底均爲 12公分×2=24公分，故此梯形之面積爲

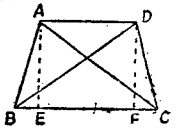
1 方公分×$\dfrac{(12+24)\times24}{2}=432$方公分　答：432方公分

❺ 兩圓的面積之比等於半徑平方之比，故此兩圓面積之比爲 $2^2:1^2$ 卽 4：1

答： 4：1

五、證明題：

❶




〔已知〕 梯形 $ABCD$ $(AD/\!/BC)$中， $AB=DC$

〔求證〕 $AC=DB$

〔證明〕 作 $AE\perp BC$, $DF\perp BC$, 前 $AE=DF$

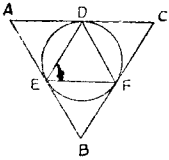
於 $\triangle ABE$, $\triangle DCF$, $AB=DC$, $AE=DF$

$\angle AEB=\angle DFC=\angle R$ $\therefore$ $\triangle ABE\equiv\triangle DCF$

$\therefore$ $\angle ABC=\angle DCB$, 又於 $\triangle AEC$, $\triangle DCB$, $AB=DC$, $\angle ABC=\angle DCB$

$BC$ 爲共通 $\therefore$ $\triangle ABC\backsim\triangle DCB$ $\therefore$ $AC=DB$

❷




〔已知〕 $\triangle ABC$ 爲圓外切正三角形，$\triangle DEF$ 爲圓內接正三角形

〔求證〕 $AB+BC+CA=2(DE+EF+FD)$

〔證明〕 $\triangle ABC$, $\triangle DEF$ 各爲正三角形，所以

$AB+BC+CA=3AB$, $DE+EF+FD=3FD$

由題意知 $AD=DC$ $BF=FC$, $\therefore$ $AB=2FD$

$\therefore$ $3AB=6FD$, 卽 $AB+BC+CA=2(DE+EF+FD)$

## 省立桃園農業職業學校

❶ 120公丈÷6公丈＝20(分鐘) 120公丈÷8公丈＝15(分鐘)

120公丈÷10公丈＝(12分鐘)

4) 20 15 12

5 15 3

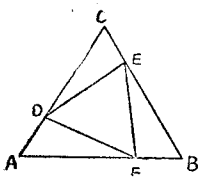
$4\times15=60$ 60分鐘＝1點鐘

答：1點鐘後三人再在原地相會

❷ 50公斤×24＝1200公斤 1200公斤÷60公斤＝20(袋) 100元÷50＝2元

2元×60＝120元 答：可裝20袋， 每袋120元

❸




〔已知〕 $\triangle ABC$爲正三角形， $AF=BE=CD$

〔求證〕 $\angle D=\angle E=\angle F$

〔證明〕 於$\triangle ADF$, $\triangle BFE$,

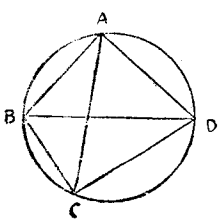
$AF=BE$, $AD=BF$, $\angle A=\angle B$ $\therefore$ $\triangle ADF\equiv\triangle BFE$

$\therefore$ $FD=EF$

同樣可證 $EF=DE$, $\therefore FD=EF=DE$

因此， $\triangle DEF$ 爲正三角形， $\therefore\angle D=\angle E=\angle F$

❶




〔已知〕 $ABCD$ 爲圓內接四邊形

〔求證〕 $\angle BAD+\angle ECD=2\angle R$

$\angle ADC+\angle ABC=2\angle R$

〔證明〕 聯結 $AC$, $BD$, 則 $\angle ACB=\angle ADB$,

$\angle ACD=\angle ABD$ $\therefore$ $\angle BAD+\angle BCD$

$=\angle BAD+\angle ACB+\angle ACD=\angle BAD$

$+\angle ADB+\angle ABD=2\angle R$ 同樣可證

$\angle ADC+\angle ABC=2\angle R$

❺ $x^2+\frac{9}{x^2}=10$ $x^4+9=10x^2$ $x^4-10x^2+9=0$ $(x^2-1)(x^2-9)=0$

$(x-1)(x+1)(x-3)(x+3)=0$ $\therefore x=1,\ -1,\ 3,\ -3$ 此等值都不使原方程式之分母爲0 答：$x=1,\ -1,\ 3,\ -3$

❻

$$\begin{array}{r|l} & x^2-xy+y^2 \\ \hline x+y & x^3\qquad\qquad +y^3 \\ & x^3+x^2y \\ \hline & -x^2y \\ & -x^2y-xy^2 \\ \hline & \qquad xy^2+y^3 \\ & \qquad xy^2+y^3 \\ \hline & \qquad\quad 0 \end{array}$$

答：$x^2-xy+y^2$

## 省立新竹師範學校

甲 算術

❶ $(0.16+0.1\dot{6}\times 3)\times\left\{100-5\div\left[\frac{7.7}{100}+0.125\times\frac{2}{5}-(0.3)^3\right]\right\}$

$=(0.16+\frac{1}{6}\times 3)\times\left\{100-5\div\left[0.077+0.05-0.027\right]\right\}$

$=(0.16\div 0.5)\times\left\{100-5\div 0.1\right\}=0.66\times(100-50)$

$=0.66\times 50$ 答：33

❷ 825人$\div(1-32\%-13\%)=825$人$\div 0.55=1500$人……報考學生數

答：報考學生共有1500人

❸ (18人+18人)$\div$(18人$-$14人)$=36$人$\div 4$人$=9$……宿舍間數

18人$\times(9-1)=18$人$\times 8=144$人……住宿生人數

答：住宿生有144人，宿舍有9間

❹ $63000\text{元}\times\frac{5}{\cancel{9000}\ 1}=45000$元……報保額

45000元$\times 3\%\times 12=16200$元……12年間所納的報險費

63000元$+16200$元$-45000$元$=34200$元……李君損失額

45000元$-16200$元$=28800$元……保險公司損失額

答：保險公司損失28800元 李君損失34200元

❺ $121°31'-118°53'=2°33'$……兩地的經差

4分$\times 2+4$秒$\times 38=8$分$+152$秒$=10$分32秒……兩地的時差

9時$+10$分32秒$=9$時10分32秒……南京9時臺北的時刻

答：臺北是9時10分32秒

乙 代數

❶ 〔A〕 $\left(a+\frac{b}{2}-\frac{c}{3}\right)\left(a-\frac{b}{2}+\frac{c}{3}\right)+\left(\frac{b}{2}+\frac{c}{3}\right)^2$

$$=\left\{\left(a+\left(\frac{b}{2}-\frac{c}{3}\right)\right)\left(a-\left(\frac{b}{2}-\frac{c}{3}\right)\right)\right\}+\left(\frac{b}{2}+\frac{c}{3}\right)^2$$

$$=a^2-\left(\frac{b}{2}-\frac{c}{3}\right)^2+\left(\frac{b}{2}+\frac{c}{3}\right)^2$$

$$=a^2-\frac{b^2}{4}+\frac{bc}{3}-\frac{c^2}{9}+\frac{b^2}{4}+\frac{bc}{3}+\frac{c^2}{9}=a^2+\frac{2bc}{3}$$

答： $a^2+\frac{2bc}{3}$

〔B〕 $\frac{x^2+7x+12}{x^2+3x-4}\times\frac{x^2-5x+6}{x^2-8x+15}\div\frac{x^2+x-6}{x^2-4x-5}$

$$=\frac{(x+3)(x+4)}{(x+4)(x-1)}\times\frac{(x-2)(x-3)}{(x-3)(x-5)}\times\frac{(x-5)(x+1)}{(x+3)(x-2)}=\frac{x+1}{x-1}$$

答： $\frac{x+1}{x-1}$

❷ 〔A〕 $x^2+2x(y+z)+y(y+2z)=x^2+2xy+2xz+y^2+2yz$

$=(x^2+2xy+y^2)+(2xz+2yz)=(x+y)^2+2(x+y)z$

$=(x+y)(x+y+2z)$ 答：$(x+y)(x+y+2z)$

〔B〕 $12a^2+2b^2+6c^2-11ab+22ac-13bc$

$=12a^2+(22c-11b)a+2b^2-13bc+6c^2$

$=12a^2+(22c-11b)a+(2b-c)(b-6c)$

$=[3a-(2b-c)][4a-(b-6c)]$

$=(3a-2b+c)(4a-b+6c)$ 答：$(3a-2b+c)(4a-b+6c)$

❸ 〔A〕 $\begin{cases}x+y=5 & ①\\ x^2+y^2-xy=7 & ②\end{cases}$ ①²−② $3xy=18$ $xy=6$ ③

解①,③得 $x=3$, $y=2$ 或 $x=2$, $y=3$

答： $\begin{cases}x=3\\y=2\end{cases}$ $\begin{cases}x=2\\y=3\end{cases}$

〔B〕 $\begin{cases}x+y+z=18 & ②\\ \frac{x+y}{5}=\frac{y+z}{7}=\frac{z+x}{6} & ②\end{cases}$ 由和比定理得 $\frac{x+y}{5}=\frac{y+z}{7}=\frac{z+x}{6}=\frac{2(x+y+z)}{18}$

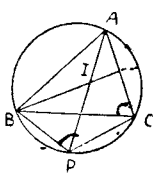
$=\frac{36}{18}=2$

$\therefore x+y=10$ ③ $y+z=14$ ④

$z+x=12$ ⑤ ③+⑤−④ $2x=8$ $\therefore x=4$ 代入③得 $y=6$

代入③得 $z=8$ 答：$x=4$ $y=6$ $z=8$

丙 幾何



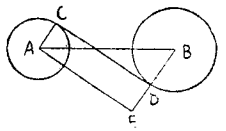

〔已知〕 $I$ 爲 $\triangle ABC$ 之內心，$AI$ 與 $\triangle ABC$ 之外接圓之交點爲 $P$.

〔求證〕 $PB=PC=PI$

〔證明〕 因 $\angle BAP=\angle CAP$ $\therefore \overset{\frown}{BP}=\overset{\frown}{PC}$ $\therefore PB=PC$

於 $\triangle PBI$, $\angle PIB=\angle PAB+\angle ABI=\angle PAC+\angle CBI=\angle PBC+CBI=\angle PBI$

$\therefore PB=PI$ $\therefore PB=PC=PI$

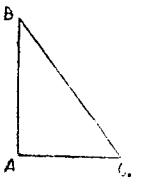
❷ 


〔題意〕 圓$A$之半徑是 3，圓 $B$ 之半徑是5，二圓中心之距離 $AB$ 是 16，求內公切線 $CD$之長

〔解〕 連結$B,D$,延長到$E$, 使$DE=AC$, 連結$A,E$ 則 $ACDE$ 爲矩形， $\therefore CD=AE$

$$=\sqrt{\overline{AB}^2-\overline{BE}^2}=\sqrt{\overline{AB}-(BD+DE)^2}=\sqrt{16^2-(5+3)^2}$$

$$=\sqrt{256-64}=\sqrt{192}=\sqrt{64\times3}=8\sqrt{3}$$ 答：$8\sqrt{3}$

❸ 


〔題意〕 於$\triangle ABC$, $\angle A=\angle R$, $BC=50$呎 $\triangle ABC=600$方呎, 求 $AB$, $AC$ 之長, $(AB>AC)$

〔解〕 設 $AB=x$呎, $AC=y$呎, 則

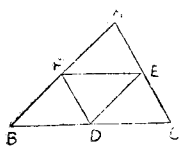
$$\begin{cases} x^2+y^2=50^2 \ ① \\ \frac{1}{2}xy=600 \ ② \end{cases} \quad ①+②\times4 \quad (x+y)^2=4900$$

$\therefore x+y=70$ ③ (因 $x+y>0$,

故捨去$-70$) ①$-$②$\times4$ $(x-y)^2=100$ $\therefore x-y=10$ ④ (因$x>y$

故捨去$-10$) ③$+$④得 $2x=80$ $\therefore x=40$ 代入③得 $y=30$

答：$AB=40$呎，$AC=30$呎

❹ 


〔已知〕 於$\triangle ABC$, $BD=DC$, $CE=EA$, $AF=FB$

〔求證〕 $\triangle AFE\equiv\triangle BDF\equiv\triangle CDE\equiv\triangle DEF$

〔證明〕 於$\triangle BBC$, $AF=FB$, $AE=EC$, $\therefore FE/\!/BC$, 即 $FE/\!/BD$ 同樣 $DE/\!/BF$ $\therefore BDEF$ 爲平行四邊形

$\therefore\triangle DEF\equiv\triangle BDF$ 同樣可證 $\triangle DEF\equiv\triangle AFE$ $\triangle DEF\equiv\triangle CDE$

## 省立新竹中學

甲、是非題

❶－ ❷－ ❸－〔註〕$Ax^2+Bx+C$ 不是方程式，應寫爲 $Ax^2+Bx+C=0$

❹－〔註〕如兩圓相交時，祇能作兩外公切線。 ❺－〔註〕此種四邊形是菱形

❻－ ❼＋ ❽＋ ❾＋ ❿＋

乙、選擇題

❶① ❷② ❸③ ❹④ ❺④ ❻③ ❼② ❽① ❾① ❿①

丙、運算題

❶ ① $-\{-[-(-5)]\}-[-(-4)]=5-4=1$

② $3-\dfrac{11}{2+\dfrac{2}{3-\dfrac{1}{3}}}=3-\dfrac{11}{2+\dfrac{6}{9-1}}=3-\dfrac{11}{2+\dfrac{6}{8}}=3-$

$$\frac{11}{2+\frac{3}{4}}=3-\frac{44}{8+3}=3-\frac{44}{11}=3-4=-1$$

答： ①1 ②−1

❷ ① $6x^2+7x+2=0$ $(2x+1)(3x+2)=0$ $2x+1=0$ 或 $3x+2=0$

$\therefore\ x=-\frac{1}{2}$ 或 $-\frac{2}{3}$

② $\sqrt{x+1}=x-5$ 兩邊平方 $x+1=x^2-10x+25$ $-x^2+11x-24=0$

$x^2-11x+24=0$ $(x-3)(x-8)=0$ $\therefore\ x=3$ 或 8 $x=3$ 時

$\sqrt{x+1}=\sqrt{3+1}=\sqrt{4}=2$ $x-5=3-5=-2$ 不適合

$x=8$ 時 $\sqrt{x+1}=\sqrt{8+1}=\sqrt{9}=3$ $x-5=8-5=3$ 可適合

答： ①$x=-\frac{1}{2}$，$-\frac{2}{3}$ ② $x=8$

❸ (1) $\begin{cases}x+y=3\cdots\cdots①\\x^3+y^3=9\cdots\cdots②\end{cases}$ 把②變形爲 $(x+y)(x^2-xy+y^2)=9$

$(x+y)[(x+y)^2-3xy]=9$ 把①代入此式

$3(9-3xy)=9$ $9-3xy=3$ $-3xy=-6$ $xy=2$ ③

解①、③ 得 $x=1$, $y=2$ 或 $x=2$、$y=1$

(2) $\begin{cases}\frac{1}{x}+\frac{1}{y}=3\cdots\cdots①\\\frac{1}{y}+\frac{1}{z}=5\cdots\cdots②\\\frac{1}{z}+\frac{1}{x}=4\cdots\cdots③\end{cases}$ ①+③−② $\frac{2}{x}=2$ $\therefore\ x=1$ 把此值

代入① $1+\frac{1}{y}=3$ $\frac{1}{y}=2$ $\therefore y=\frac{1}{2}$

又代入③ $\frac{1}{z}+1=4$ $\frac{1}{z}=3$ $\therefore z=\frac{1}{3}$

答： (1) $\begin{cases}x=1\\y=2\end{cases}$ $\begin{cases}x=2\\y=1\end{cases}$ (2) $x=1$, $y=\frac{1}{2}$, $z=\frac{1}{3}$

❶ $mx^2+2x+1=0$ 之判別式爲 $1^2-m\times1=1-m$

① 不等實數， 判別式應大於0， $\therefore$ $1-m>0$ 即 $m<1$

② 相等實數， 判別式應等於0， $1-m=0$ 即 $m=1$

③ 共軛複數， 判別式應小於0， $1-m<0$ 即 $m>1$

答： ① $m<1$ ② $m=1$ ③ $m>1$

❺ 設此眞分數爲$\frac{x}{y}$， 依題意得下列方程式：

$\begin{cases}y=x+5\cdots\cdots①\\\frac{x-3}{y-3}=\frac{5}{7}\cdots\cdots②\end{cases}$ 由②得 $7(x-3)=5(y-3)$ $7x-21=5y-15$

$7x-5y=6$ ③ ①代入③ $7x-5(x+5)=6$

$7x-5x-25=6$ $2x=31$ $x=15.5$ 代入①

得 $y=20.5$

Ⅰ 如果分數之分母與分子只限定整數，則本題就無解答，

Ⅱ 如果分數之分母與分子可用小數，則本題之解答爲 $\frac{15.5}{20.5}$

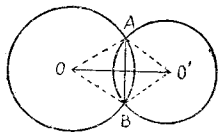
答： Ⅰ無解 Ⅱ $\frac{15.5}{20.5}$

❻ 560人÷(1−19%−25%)=560人÷56%=1000人

答： 全校學生人數1000人

❼ 〔已知〕 二圓 $O.O'$ 相交於 $A$ 與 $B$

〔求證〕 連心線 $OO'$ 垂直平分 $AB$




〔證明〕 連結 $OA, OB, O'A, O'B$

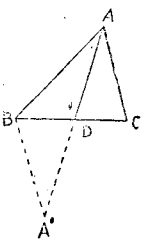
則 $\left.\begin{matrix} OA=OB \\ O'A=O'B \\ OO' \text{公共} \end{matrix}\right\} \therefore \triangle OAO' \equiv \triangle OBO'$

$\therefore \angle O'OA = \angle O'OB$

$\triangle OAB$ 是等腰三角形，$OO'$ 是頂角 $O$ 的平分線，故必垂直平分底邊 $AB$。

❽ 〔解析〕 已知兩邊爲 $b, c$ 第三邊上的中線爲 $d$，假設 $\triangle ABC$ 爲所求之三角形，延長中線 $AD$ 至 $A'$，使 $AD=DA'$ 連結 $BA'$

則 $\left.\begin{matrix} AD=DA' \\ CD=BD \\ \angle ADC=\angle BDA' \end{matrix}\right\} \therefore \triangle ADC \equiv \triangle BDA'$




$\therefore A'B=AC=b$ 又 $AB=c$

$AA'=2d$ $\triangle ABA'$ 之三邊都是已知，故可以先作此三角形。

〔作圖〕 作 $\triangle ABA'$ 使其三邊 $AB, BA', AA'$ 分別等於 $c, b, 2d$，取 $AA'$ 之中點 $D$，連結 $BD$，延長至 $C$ 連結 $AC$ 則 $\triangle ABC$ 就是所求之三角形。

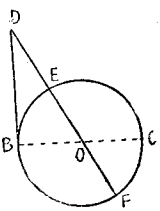
〔證明〕 由作圖知 $BD=DC$ 所以 $AD$ 是中線

又 $AD=\frac{1}{2}AA'=\frac{1}{2}\times 2d=d$, $AB=c$ 從 $\triangle ADC \equiv \triangle BDA'$ 得 $AC=A'B=b$ 故 $\triangle ABC$ 可適合題意。

〔討論〕 $b+c>2m>b\sim c$ 時恒有一解，其他則無解。

❾ 〔解析〕 設 $l$ 爲長之差，$a^2$ 爲已知正方形之面積，又設此矩形已作得，其二邊爲 $DE$ 及 $DF$，以二邊 $DE, DF$ 之差 $EF$ 爲直徑畫一圓，自 $D$ 作此圓之切線 $DB$，則

$\overline{DB}^2=DE, DF=a^2$ 故 $DB=a$，自 $B$ 引直徑 $BC$，則 $BC=EF=l$




〔作圖〕 作一直角於其一邊取與 $a$ 等長之 $BD$ 又於其他邊取與 $\frac{1}{2}$ 等長之 $BO$，以 $BO$ 爲半徑，以 $O$ 爲圓心畫一圓，連結 $DO$ 並延長之，與此圓交於 $E, F$ 二點，用 $DE, DF$ 爲二邊作矩形，便合所求。

〔證明〕 $DB$ 爲切線，$DEF$ 爲割線 $\therefore DE\cdot DF=\overline{BD}^2=a^2$

又 $DF-DE=EF=2BO=2\times\frac{l}{2}=l$

〔討論〕 無論 $a, l$ 之大小如何恒有一解。

⑩ $\begin{cases} ax+by=c \cdots\cdots ① \\ a'x+b'y=c' \cdots ② \end{cases}$ ①$\times b'$ − ②$\times b$ $(ab'-a'b)x=b'c-bc'$

設 $ab'-a'b\neq 0$, 則 $x=\dfrac{b'c-bc'}{ab'-a'b}$

②$\times a$ − ①$\times a'$ $(ab'-a'b)y=b'a-ca'$ 設 $ab'-a'b\neq 0$

則 $y=\dfrac{c'a-ca'}{ab'-a'b}$

討論 Ⅰ $ab'-a'b\neq 0$ 即 $\dfrac{a}{b}\neq\dfrac{a'}{b'}$ 時，有一組確定解答

$$x=\frac{b'c-bc'}{ab'-a'b} \qquad y=\frac{c'a-ca'}{ab'-a'b}$$

Ⅱ $ab'-a'b=0$, $b'c-bc'=0$, 即 $\dfrac{a}{a'}=\dfrac{b}{b'}=\dfrac{c}{c'}$ 時爲不定

Ⅲ $ab'-a'b=0$, $b'c-bc'\neq 0$ 即 $\dfrac{a}{a'}=\dfrac{b}{b'}\neq\dfrac{c}{c'}$ 時爲不能

## 省立新竹女子中學

❶ 24里÷4＝6里……划速的2倍

6里÷2＝3里……划速

3里＋1里＝4里……下航速度

3里－1里＝2里……上航速度

24里÷4里＝6(小時)……甲船自上埠到下埠所需的時間

24里÷2里＝12(小時)……乙船自下埠到上埠所需的時間

6小時－4小時＝2小時……相會後甲船到下埠所需的時間

12小時－4小時＝8小時……相會後乙船到上埠所需的時間

答：相會後甲船到下埠要2小時，乙船到上埠要8小時

❷ $x^4-2(a^2+b^2)x^2+(a^2-b^2)^2=x^4-2(a^2+b^2)x^2+(a+b)^2(a-b)^2$

$=[x^2-(a+b)^2][x^2-(a-b)^2]=(x+a+b)(x-a-b)(x+a-b)(x-a+b)$

答：$(x+a+b)(x-a-b)(x+a-b)(x-a+b)$

❸ $\dfrac{5-6\sqrt{-1}}{7-14\sqrt{-1}}=\dfrac{5-6\sqrt{-1}}{7(1-2\sqrt{-1})}=\dfrac{(5-6\sqrt{-1})(1+2\sqrt{-1})}{7(1-2\sqrt{-1})(1+2\sqrt{-1})}$

$=\dfrac{5+10\sqrt{-1}-6\sqrt{-1}+12}{7(1+4)}=\dfrac{17+4\sqrt{-1}}{35}$ 答：$\dfrac{17+4\sqrt{-1}}{35}$

❹ $\begin{cases} x^2+3y^2=31 \ ① \\ 7x^2-2y^2=10 \ ② \end{cases}$ ①$\times 2$+②$\times 3$ $23x^2=92$ $x^2=4$

$\therefore x=\pm 2$ 代入① $4+3y^2=31$ $3y^2=27$ $y^2=9$ $\therefore y=\pm 3$

答：$\begin{cases} x=2 \\ y=3 \end{cases}$ $\begin{cases} x=2 \\ y=-3 \end{cases}$ $\begin{cases} x=-2 \\ y=3 \end{cases}$ $\begin{cases} x=-2 \\ y=-3 \end{cases}$

❺ $\dfrac{x-4}{x-5}-\dfrac{x-5}{x-6}=\dfrac{x-7}{x-8}-\dfrac{x-8}{x-9}$ $\dfrac{x-5+1}{x-5}-\dfrac{x-6+1}{x-6}=\dfrac{x-8+1}{x-8}-\dfrac{x-9+1}{x-9}$

$1+\frac{1}{x-5}-1-\frac{1}{x-6}=1+\frac{1}{x-8}-1-\frac{1}{x-9}$　　$\frac{1}{x-5}-\frac{1}{x-6}=\frac{1}{x-8}-\frac{1}{x-9}$

$\frac{x-6-x+5}{(x-5)(x-6)}=\frac{x-9-x+8}{(x-8)(x-9)}$　　$\frac{-1}{(x-5)(x-6)}=\frac{-1}{(x-8)(x-9)}$

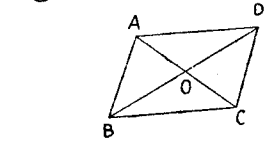
$(x-5)(x-6)=(x-8)(x-9)$　$x^2-11x+30=x^2-17x+72$　$6x=42$　$\therefore x=7$

此值不使原方程式之分母爲 0，故可採用　　答：$x=7$

❻ 設方程式 $x^2+px+q=0$ 之二根爲 $2$, $2\frac{1}{2}$，則 $2+2\frac{1}{2}=-p$ ①　$2\cdot 2\frac{1}{2}=q$ ②

由①得 $2=-\frac{p}{3}$　代入 ②　$2(-\frac{p}{3})^2=q$　$\frac{2p^2}{9}=q$　$\therefore 2p^2=9q$

❼




〔已知〕 $ABCD$ 爲平行四邊形

〔求證〕 $\overline{AB}^2+\overline{BC}^2+\overline{CD}^2+\overline{DA}^2=\overline{AC}^2+\overline{BD}^2$

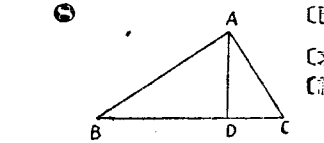
〔證明〕 設 $AC$, $BD$ 之交點爲 $O$，則 $AO=OC$, $BO=OD$，於 $\triangle ABC$，應用中線定理得

$\overline{AB}^2+\overline{BC}^2=2\overline{AO}^2+2\overline{BO}^2$　$2\overline{AB}^2+2\overline{BC}^2$

$=4\overline{AO}^2+4\overline{BO}^2=(2AO)^2+(2BO)^2$ 又 $AB=CD$, $BC=DA$ $2AO=AC$

$2BO=BD$ $\therefore \overline{AB}^2+\overline{BC}^2+\overline{CD}^2+\overline{DA}^2=\overline{AC}^2+\overline{BD}^2$

❽




〔已知〕 於 $\triangle ABC$, $\angle BAC=\angle R$

〔求證〕 $\overline{BC}^2=\overline{AB}^2+\overline{AC}^2$

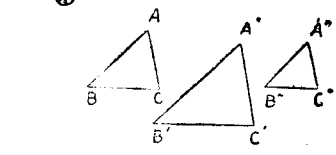
〔證明〕 作 $AD\perp BC$，於 $\triangle ABD$, $\triangle CBA$, $\angle ABD=\angle CBA$, $\angle ADB=\angle CAB$

$\therefore \triangle ABD\backsim\triangle CBA$　$\therefore AB:BC=BD:AB$

即 $\overline{AB}^2=BD\cdot BC$……①　同法可證 $\overline{AC}^2=DC\cdot BC$……② ①+②得

$\overline{AB}^2+\overline{AC}^2=BD\cdot BC+DC\cdot BC=(BD+DC)BC=\overline{BC}^2$

❾




〔已知〕 $\triangle ABC\backsim\triangle A'B'C'$

$\triangle A'B'C'\backsim\triangle A''B''C''$

〔求證〕 $\triangle ABC\backsim\triangle A''B''C''$

〔證明〕 $\triangle ABC\backsim A'B'C'$ $\therefore \angle A=\angle A'$, $\angle B=\angle B'$　$\triangle A'B'C'\backsim\triangle A''B''C''$

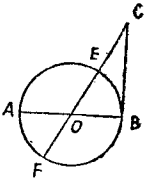
$\therefore \angle A'=\angle A''$　$\angle B'=\angle B''$

因此，$\angle A=\angle A''$　$\angle B=\angle B''$

故 $\triangle ABC\backsim\triangle A''B''C''$

答：第一三角形與第三三角形一定相似

❿ 〔作圖〕 已知正方形的面積爲 $a^2$，已知線段爲 $b^2$，先作 $AB$，使其長等於 $b$，用 $AB$ 做直徑畫圓 $O$。過 $B$，作圓 $O$ 之切線 $BC$，使其長等於 $a$，連結 $CO$. 交圓周於 $E$, $F$, 以 $CF$ 爲底，$CE$ 爲高作矩形便合所求。




〔證明〕 $CE\cdot CF=\overline{CB}^2=a^2$，故此矩形與已知正方形等積

$CF-CE=EF=AB=b$，故此矩形之底與高爲

差等於已知線段

〔討論〕 無論 $a$, $b$ 之大小如何，常有一解。

## 省立新竹工業職業學校

一 ❶ − ❷ + ❸ −〔註〕如 $n=3$, $a=8$, 則 $\sqrt[n]{-a^2}=\sqrt[3]{-8^2}=\sqrt[3]{-64}=-4$ ❹ +〔註〕$\frac{1}{8^{-\frac{1}{3}}}=8^{\frac{1}{3}}=(2^3)^{\frac{1}{3}}=2$ ❺ −〔註〕$\sqrt{-4}\sqrt{-4}=2i\ 2i=4i^2=-4$ ❻ − ❼ + ❽ − ❾ +〔註〕如果三點在一直線上，過這三點就不能作一圓 ❿ +

二 ❶ $1, -1, i, -i$ ❷ 1, 2 ❸ $(x+y-z)(x-y+z)$ ❹ $\sqrt{5}+1$, $-(\sqrt{5}+1)$ ❺ $\pm 1$, $\frac{3}{4}$, $\pm\frac{1}{3}$ ❻ $-3x+11$ ❼ 直角 ❽ 半徑之差 ❾ 3 ❿ 150

三 ❶ $6x^4-13x^3-5x^2+17x-6=6x^4-12x^3-x^3+2x^2-7x^2+14x+3x-6$

$=6x^3(x-2)-x^2(x-2)-7x(x-2)+3(x-2)$

$=(x-2)(6x^3-x^2-7x+3)=(x-2)(6x^3-3x^2+2x^2-7x+3)$

$=(x-2)[3x^2(2x-1)+(2x-1)(x-3)]$

$=(x-2)(2x-1)(3x^2+x-3)$

答：$(x-2)(2x-1)(3x^2+x-3)$

❷ $\begin{cases}\frac{1}{x}-\frac{1}{z}=9 & ① \\ \frac{2}{y}+\frac{1}{z}=5 & ③ \\ \frac{3}{x}+\frac{4}{y}=2 & ⑤\end{cases}$ ①+② $\frac{1}{x}+\frac{2}{y}=6$ ④

③−④×2 $\frac{1}{x}=-10$ ∴ $x=-\frac{1}{10}$

代入① $-10-\frac{1}{z}=1$ $\frac{1}{z}=-11$ ∴ $z=-\frac{1}{11}$

代入② $\frac{2}{y}-11=5$ $\frac{2}{y}=16$ ∴ $y=\frac{1}{8}$

答：$x=-\frac{1}{10}$, $y=\frac{1}{8}$, $z=-\frac{1}{11}$

❸ $\alpha, \beta$ 爲 $x^2+px+q=0$ 之二根，∴ $\alpha+\beta=-p$ $\alpha\beta=q$

$\frac{1}{\alpha^2}+\frac{1}{\beta^2}=\frac{\beta^2+\alpha^2}{\alpha^2\beta^2}=\frac{(\alpha+\beta)^2-2\alpha\beta}{(\alpha\beta)^2}=\frac{(-p)^2-2q}{q^2}=\frac{p^2-2q}{q^2}$

$\frac{1}{\alpha^2\beta^2}=\frac{1}{q^2}$, 因此，以 $\frac{1}{\alpha^2}$, $\frac{1}{\beta^2}$ 爲二根之方程式爲 $x^2-\frac{p^2-2q}{q^2}x+\frac{1}{q^2}=0$ 即 $q^2x^2-(p^2-2q)x+1=0$ 答：$q^2x^2-(p^2-2q)x+1=0$

❹ 設此兩數爲 $x$, $y$, 則 $\begin{cases}x+y=28 & ① \\ x^2+y^2=394 & ②\end{cases}$

由②得 $(x+y)^2-2xy=394$ ③ ①代入③ $784-2xy=394$, $-2xy=-390$

$xy=195$ ④ 解 ①, ④得 $x=15$, $y=13$ 或 $x=13$, $y=15$ 答：13, 15

❺ 100公尺 $\times\frac{3}{5}$=60公尺　60公尺÷$(1-\frac{3}{5})$=60公尺÷$\frac{2}{5}$

=60公尺$\times\frac{5}{2}$=150公尺　150公尺×2=300公尺

300公尺+60公尺=360公尺　　答：360公尺

## 省立新竹商業職業學校

❶ 10元×2000=20000元　20000元−17372元=2628元　10元−8元=2元

2628元÷2元=1314(人)……初中報名投考人數

2000人−1314人=686人……高中報名投考人數

答：高中686人，初中1314人

❷ 4個÷3個=$\frac{4}{3}$　$2-\frac{4}{3}=\frac{2}{3}$　16個÷$\frac{2}{3}$=$\overset{8}{\cancel{16}}$個$\times\frac{3}{\cancel{2}_{1}}$=24個……橘子的個數　24個×2=48個……蘋果的個數　　答：蘋果48個，橘子24個

❸ 4個×100=400個　400個−100個=300個　4個−$\frac{1}{4}$個=$\frac{15}{4}$個

300個÷$\frac{15}{4}$個=$\overset{20}{\cancel{300}}\times\frac{4}{\cancel{15}_{1}}$=80(人)……小和尚的人數

100人−80人=20人……大和尚的人數

答：大和尚20人，小和尚80人

❹ $\frac{(y+1)(y+9)}{y-1}=4y-3$　$(y+1)(y+9)=(y-1)(4y-3)$

$y^2+10y+9=4y^2-7y+3$　$-3y^2+17y+6=0$　$3y^2-17y-6=0$

$(3y+1)(y-6)=0$　∴ $y=-\frac{1}{3}$, 6　此兩值都不使原方程式之分母爲0,

答：$y=-\frac{1}{3}$, 6

❺ $\begin{cases}x-y=4 & ①\\ x^2+y^2=40 & ③\end{cases}$　由②得 $(x-y)^2+2xy=40$ ②

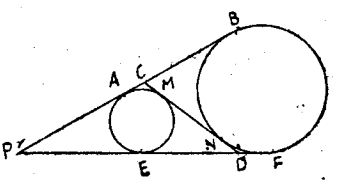
①代入③　$16+2xy=40$　$2xy=24$

$xy=12$④　由①得 $x=y+4$ ⑤　⑤代入④　$y(y+4)=12$　$y^2+4y-12=0$

$(y+6)(y-2)=0$　∴ $y=-6$或2　代入⑤得 $x=-2$或6

答：$\begin{cases}x=-2\\ y=-6\end{cases}$　$\begin{cases}x=6\\ y=2\end{cases}$

❻




〔已知〕 $AB$, $EF$ 爲兩圓的外公切線，$C$,$D$ 爲一內公切線$MN$與$AB$, $EF$的交點

〔求證〕 $AB=CD$

〔證明〕 $BA$, $FE$ 的延長線之交點爲$P$,

則 $\left.\begin{matrix}CM=CA\\DM=DE\\PA=PE\end{matrix}\right\}$ $\therefore CM+DM+PA=CA+DE+PE$

即 $CD+PA=\frac{1}{2}(PC+PD+CD)$

$\therefore\ CD=\frac{1}{2}(PC+PD+CD)-PA$ ①

又 $PB=PF$

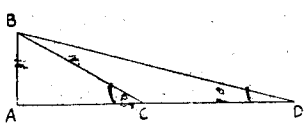
$\therefore\ PB=\frac{1}{2}(PB+PF)=\frac{1}{2}(PC+CB+PD+DF)$

$=\frac{1}{2}(PC+CN+PD+DN)=\frac{1}{2}(PC+PD+CD)$

$\therefore\ AB=PB-PA=\frac{1}{2}(PC+PD-CD)-PA$ ②

比較 ①, ② 得 $AB=CD$

❼




左圖內 $\angle A=\angle R$, $\angle BDA=15°$, $\angle BCA=30°$ $DC=300$尺 於$\triangle BCD$, $\angle CBD=\angle BCA-\angle BDA=30°-15°$ $=15°$ $\therefore\angle CBD=\angle BDA$ $\therefore BC=DC$ $=300$尺, 於$\triangle ABC$, $\angle A=\angle R$

$\angle BCA=30°$, $\therefore\ AB=\frac{1}{2}BC=300\text{尺}\times\frac{1}{2}=150\text{尺}$ 答：150尺

## 省立苗栗中學

一 算術

❶ $48-16+7\times4-18\div3\times9+4=32+28-54+4=10$ 答：10

❷ 2000元÷(5−3)=1000元……酒1斤和醬油1斤價錢的差

25000元+1000元×3=28000元……酒5斤+3斤=8斤的價錢

28000元÷8=3500元……酒1斤的價錢

3500元−1000元=2500元……醬油1斤的價錢

答：酒每斤3500元，醬油每斤2500元

❸ 4000元$\times(1+0.06)^3$ $=4000\text{元}\times1.191016=4764.064\text{元}$…三年後的本利和

答：三年後的本利和 4764.064元

二 代數

❶ (a) $(a+b+c)^3=(a+b)^3+3(a+b)^2c+3(a+b)c^2+c^3$

$=a^3+3a^2b+3ab^2+b^3+3a^2c+6abc+3b^2c+3ac^2+3bc^2+c^3$

$=a^3+b^3+c^3+3a^2b+3ab^2+3a^2c+3ac^2+3b^2c+3bc^2+6abc$

答：$a^3+b^3+c^3+3a^2b+3ab^2+3a^2c+3ac^2+3b^2c+3bc^2+6abc$

(b) $(a+b)^n=a^n+na^{n-1}b+\frac{n(n-1)}{2}a^{n-2}b^2+\frac{n(n-1)(n-2)}{3!}a^{n-3}b^3$

$+\cdots\cdots+\frac{n(n-1)(n-2)\cdots\cdots(n-r+1)}{r!}a^{n-r}b^r+\cdots\cdots+b^n$

答：$a^n+na^{n-1}b+\frac{n(n-1)}{2}a^{n-2}b^2+\frac{n(n-1)(n-2)}{3!}a^{n-3}b^3$

$+\cdots\cdots+\frac{n(n-1)(n-2)\cdots\cdots(n-r+1)}{r!}a^{n-r}b^r+\cdots+b^n$

❷ $\begin{cases}5x-6y+3z=2 & ①\\ 3x+5y-2z=7 & ②\\ 2x+3y+z=11 & ③\end{cases}$ ③×3−① $x+15y=31$ ④ ③×2+② $7x+11y=29$ ⑤

④×7−⑤ $94y=188$ $\therefore y=2$

代入④ $x+30=31$ $\therefore x=1$ 將$x=1$, $y=2$ 代入① $5-12+3z=2$ $3z=9$

$\therefore z=3$ 答：$x=1$, $y=2$, $z=3$

❸ $x^3+2x^2+2x+1=(x^3+1)+(2x^2+2x)=(x+1)(x^2-x+1)+2x(x+1)$

$=(x+1)(x^2-x+1+2x)=(x+1)(x^2+x+1)$

答：$(x+1)(x^2+x+1)$

❹ 設此三數爲 $x-1$, $x$, $x+1$ 則 $(x-1)^2+x^2+(x+1)^2=245$

$x^2-2x+1+x^2+x^2+2x+1=245$ $3x^2+2=245$ $3x^2=243$ $x^2=81$

$\therefore x=9$ 或$-9$, $x=9$時，此三數爲 8, 9, 10 $x=-9$時，此三數爲

$-10$, $-9$, $-8$, 答：8, 9, 10 或 $-10$, $-9$, $-8$

❺ 設甲獨做$x$日可成，乙獨做$y$日可成，則 $\begin{cases}12\left(\frac{1}{x}+\frac{1}{y}\right)=1 & ①\\ y=x+10 & ②\end{cases}$

②代入① $\frac{12}{x}+\frac{12}{x+10}=1$ $12(x+10)+12x=x(x+10)$

$12x+120+12x=x^2+10x$ $-x^2+14x+120=0$ $x^2-14x-120=0$

$(x-20)(x+6)=0$ $x+6>0$, $\therefore x-20=0$ $\therefore x=20$ 代入②得

$y=20+10=30$ 答：甲獨做20日可成，乙獨做30日可成

❻ 設順流航速爲每時$x$里，逆流航速爲每時$y$里，依題意得方程式

$\begin{cases}\frac{20}{x}+\frac{20}{y}=10 & ①\\ \frac{4}{x}=\frac{3}{y} & ②\end{cases}$ ②代入① $\frac{15}{y}+\frac{20}{y}=10$ $\frac{35}{y}=10$ $\therefore y=\frac{7}{2}$

代入② $\frac{4}{x}=\frac{3}{\frac{7}{2}}$ $\frac{4}{x}=\frac{6}{7}$ $\therefore x=\frac{14}{3}$

因此，下行所需的時間爲 $20\div\frac{14}{3}=\frac{10}{20}\times\frac{3}{\frac{14}{7}}=\frac{30}{7}=4\frac{2}{7}$

上行所需的時間爲 $20\div\frac{7}{2}=20\times\frac{2}{7}=\frac{40}{7}=5\frac{5}{7}$

答：上行走 $5\frac{5}{7}$時，下行走 $4\frac{2}{7}$時

❼ $a, b, c$ 的倒數 $\frac{1}{a}$, $\frac{1}{b}$, $\frac{1}{c}$成等差級數

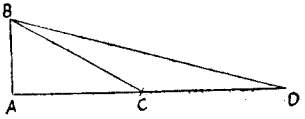
所以 $\frac{1}{b}-\frac{1}{a}=\frac{1}{c}-\frac{1}{b}$ $\frac{a-b}{ab}=\frac{b-c}{ac}$ $\frac{a-b}{a}=\frac{b-c}{c}$

即 $a-b:a=b-c:c$

由反比定理得 $a:a-b=c:b-c$　由更比定理得 $a:c=a-b:b-c$

三 幾何

❶

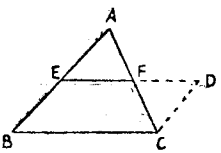



〔解〕 於$\triangle ABC$, $\angle A=\angle R$, $\angle BCA=30°$
$\therefore AB=12BC$, 於$\triangle BCD$, $\angle BDA=15°$ $\angle CBD=\angle BCA-\angle BDA=30°-15°=15°$ $\therefore BC=DC=300$公尺

因此, $AB=300$公尺$\times\frac{1}{2}=150$公尺　答：150公尺

❷ 〔解〕 $360°\div 12=30°$……每一外角的度數
$180°-30°=150°$……每一內角的度數
答：內角150° 外角30°

❸




〔已知〕 於$\triangle ABC$, $AE=EB$, $AF=FC$

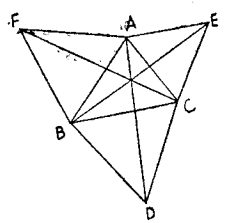
〔求證〕 $EF\parallel\frac{1}{2}BC$

〔證明〕 延長$EF$到$P$, 使$FP=EF$, 連結$CP$, 於$\triangle AEF$, $\triangle CPF$ $AF=FC$, $EF=FP$, $\angle AFE=\angle CFP$

$\therefore \triangle AEF\equiv\triangle CPF$ $\therefore \angle EAF=\angle PCF$ $\therefore CP\parallel EA$ 即 $CP\parallel BE$ 又 $CP=AE$ 而 $AE=BE$ $\therefore CP=BE$, 於四邊形 $BEPC$ $CP\parallel BE$ 故此四邊形爲平行四邊形, 由是 $EP\parallel BC$ 而 $EF=\frac{1}{2}EP$

$\therefore EF\parallel\frac{1}{2}BC$

❹




〔已知〕 $\triangle ABF$, $\triangle BCD$, $\triangle ACE$ 都是正三角形

〔求證〕 $AD=BE=CF$

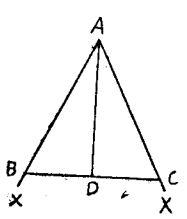
〔證明〕 於$\triangle ACD$, $\triangle ECB$

$AC=EC$
$CD=CB$
$\angle ACD=\angle ECB$

$\therefore \triangle ACD\equiv\triangle ECB$ $\therefore AD=BE$

同樣可證 $BE=CF$ $\therefore AD=BE=CF$

❺




〔作圖〕 已知之頂角爲$2\alpha$, 高爲$h$, 作$\angle XAY=2\alpha$, 作此角之分角線 $AD$, 在其上取一點$D$, 使 $AD=h$, 過$D$, 作$DA$之垂線 $BC$, 交 $AX$ 於$B$, 交$AY$於$C$, 則$\triangle ABC$便合所求。

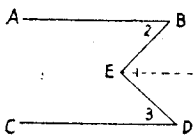
〔證明〕 於$\triangle ABD$, $\triangle ACD$, $\angle BAD=\angle CAD$, $AD$爲共通 $\angle ADB=ADC$ $\therefore \triangle ABD\equiv\triangle ACD$, $\therefore AB=AC$ 故$\triangle ABC$爲等腰三角形, 作圖, 知頂角 $BAC$ 等於 $2\alpha$ 高 $AD$ 等

於 $h$

〔討論〕 恒方一解

## 省立苗栗農業職業學校

(幾何)

❶ 


〔已知〕 $AB/\!/CD$

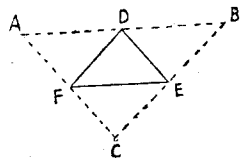
〔求證〕 $\angle 1=\angle 2+\angle 3$

〔證明〕 過$E$, 作$EF/\!/AB$, 則$EF/\!/CD$

$\therefore \angle BEF=\angle 2$, $\angle DEF=\angle 3$

$\therefore \angle BEF+\angle DEF=\angle 2+\angle 3$

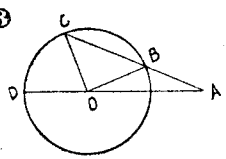
即 $\angle 1=\angle 2+\angle 3$

❷ 


〔作圖〕 已知三角形三邊之中點各爲$D,E,F$ 聯結 $DE$, $EF$, $FD$, 過$D$ 作$AB/\!/FE$, 過$E$, 作 $BC/\!/DF$, 過$F$, 作 $AC/\!/DE$ 作 $\triangle ABC$ 便合所求

〔證明〕 $DB/\!/FE$, $DF/\!/DE$ 所以 $BDFE$ 是平行四邊形, $\therefore DB=FE$ 同樣 $AD=FE$ $\therefore AD=DB$ 同樣可證$AF=FC$, $BE=EC$

〔討論〕 三點 $D$, $E$, $F$ 不在一直線時恒可作圖。

❸ 


〔已知〕 $O$是圓心, $OB=AB$

〔求證〕 $\angle COD=3\angle A$

〔證明〕 設$\angle A=2$ 於$\triangle OAB$, $OB=AB$

$\therefore \angle AOB=\angle A=2$ $\angle OBC$

$=\angle AOB+\angle A=2\angle$ 於$\triangle OBC$,

$OB=OC$, $\therefore \angle OCB=\angle OBC=2\angle$

於 $\triangle OAC$, $\angle COD=\angle A+\angle OCB=2+2\angle=3\angle$

$\therefore \angle COD=3\angle A$

(代數)

❶ $x^2-[2x^2+x-(3x-1)-x^2]+1=x^2-[2x^2+x-3x+1-x^2]+1$

$=x^2-[x^2-2x+1]+1=x^2-x^2+2x-1+1=2x$ 答：$2x$

❷ $x^2+7xy+10y^2=(x+2y)(x+5y)$ 答：$(x+2y)(x+5y)$

❸ $\sqrt{x+3}+3=x$ $\sqrt{x+3}=x-3$ 兩邊平方 $x+3=x^2-6x+9$

$-x^2+7x-6=0$ $x^2-7x+6=0$ $(x-1)(x-6)=0$ $\therefore x=1$ 或6

檢驗的結果知只 $x=6$可以適合原方程式 答：$x=6$

❼ 公差： $-\frac{1}{2}-(-1)=\frac{1}{2}$ 第10項： $-1+9\times\frac{1}{2}=\frac{7}{2}$

$=3\frac{1}{2}$ 自初項至第10項的總和 $\frac{10(-1+\frac{7}{2})}{2}=\frac{25}{2}=12\frac{1}{2}$

答：第10項 $3\frac{1}{2}$，總和 $12\frac{1}{2}$

❽ $\begin{cases} x+y=5 & ① \\ y+z=10 & ② \\ z+x=7 & ③ \end{cases}$ ①+③−② $2x=2$ $\therefore x=1$ 代入① $1+y=5$ $\therefore y=4$ 代入③ $z+1=7$ $\therefore z=6$ 答：$\begin{cases} x=1 \\ y=4 \\ z=6 \end{cases}$

(算術)

❾ $$\frac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2}}}}=\frac{1}{1+\cfrac{1}{2+\cfrac{2}{2+1}}}-\frac{1}{1+\cfrac{1}{2+\cfrac{2}{3}}}-\frac{1}{1+\cfrac{3}{6+2}}$$

$$=\frac{1}{1+\cfrac{3}{8}}=\frac{8}{8+3}=\frac{8}{11}$$ 答：$\frac{8}{11}$

❿ $45000$元 $\times\frac{5}{9}=25000$元……長子的所得

(45000元−25000元)÷2=10000元……次子與幼子的所得

答：長子得25000元，次子與幼子各得10000元

## 省立臺中師範學校

❶ 4704÷168=28……二數的最大公約數

168÷28=6=1×6=2×3　　故此二數爲

28×1=28　28×6=168　或　28×2=56，　28×3=84

答：　28，168 或 56，85

❷ $x(x^2-1)-y(y^2-1)+xy(x-y)=x^3-x-y^3+y+xy(x-y)=(x^3-y^3)$
$-(x-y)+xy(x-y)=(x-y)(x^2+xy+y^2)-(x-y)+xy(x-y)$
$=(x-y)(x^2+xy+y^2-1+xy)=(x-y)(x^2+2xy+y^2-1)$
$=(x-y)[(x+y)^2-1]=(x-y)(x+y+1)(x+y-1)$

答：　$(x-y)(x+y+1)(x+y-1)$

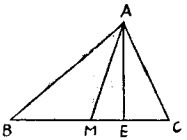
❸ $\frac{x^2-3x}{x^2-1}+\frac{1}{x-1}+4=0$　設 $x^2-1\neq 0$，　兩邊乘此式，去分母得

$x^2-3x+(x+1)+4(x^2-1)=0$　$x^2-3x+x+1+4x^2-4=0$　$5x^2-2x-3=0$

$(5x+3)(x-1)=0$　$\therefore x=-\frac{3}{5}$ 或 1，祇有 $x=-\frac{3}{5}$ 可適合　$x^2-1\neq 0$

答：　$x=-\frac{3}{5}$

❹ $b$ 爲 $a$，$c$ 的比例中項　故 $b^2=ac$　$(a-b+c)(a+b+c)(a^2-b^2+c^2)$
$=[(a+c)^2-b^2](a^2+c^2-b^2)=(a^2+2ac+c^2-ac)(a^2+c^2-ac)$
$=(a^2+c^2+ac)(a^2+c^2-ac)=(a^2+c^2)^2-a^2c^2=a^4+2a^2c^2+c^4-a^2c^2$
$=a^4+a^2c^2+c^4=a^4+b^4+c^4$

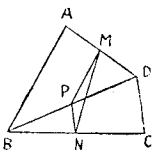
❺ 


〔已知〕 $\triangle AEC$ 中 $BM=CM$

〔求證〕 $\overline{AB}^2+\overline{AC}^2=2(\overline{AM}^2+\overline{BM}^2)$

〔證明〕 作 $AE\perp BC$, 則 $\angle AEB=\angle AEC=\angle R$

$\therefore \overline{AB}^2+\overline{AC}^2=\overline{AE}^2+\overline{BE}^2+\overline{AE}^2+\overline{EC}^2=2\overline{AE}^2$
$+(BM+ME)^2+(CM-ME)^2=2\overline{AE}^2+$
$(BM+ME)^2+(BM-ME)^2=2\overline{AE}^2+\overline{BM}^2+2BM\cdot ME+\overline{ME}^2+\overline{BM}^2$
$-2BM\cdot ME+\overline{ME}^2=2\overline{AE}^2+2\overline{BM}^2+2\overline{ME}^2=2(\overline{AE}^2+\overline{ME}^2+\overline{BM}^2)$
$=2(\overline{AM}^2+\overline{BM}^2)$

❻ 


〔已知〕 四邊形 $ABCD$ 中 $AB\nparallel CD$, $AM=MD$, $BN=NC$

〔求證〕 $MN<\frac{1}{2}(AB+CD)$

〔證明〕 引對角線 $BD$, 其中點爲 $P$, 聯結 $MP$, $NP$, 因爲 $AB\nparallel CD$, 故三點 $M, P, N$ 不在一直線上,

$\therefore MN<MP+NP$ 於$\triangle ABD$, $AM=MD$, $BP=PD$, $\therefore MP=\frac{1}{2}AB$,

同樣可證 $NP=\frac{1}{2}CD$ 因此, $MN<\frac{1}{2}AB+\frac{1}{2}CD$

即 $MN<\frac{1}{2}(AB+CD)$

## 省立臺中第一中學

一 是非題

❶ −〔註〕右邊應改爲 $-12a^3b^2c^2i$ ❷ +〔註〕因爲 $b^2+a^2\geqq 0$

❸ − ❹ − ❺ +

二 問答題

❶ $(2-3x^2)^4=2^4-4\cdot 2^3\cdot 3x^2+6\cdot 2^2(3x^2)^2-4\cdot 2(3x^2)^3+(3x^2)^4$
$=16-96x^2+216x^4-216x^6+81x^8$

❷ $\frac{e^{3n}-e^{-3n}}{e^n-e^{-n}}=\frac{(e^n-e^{-n})(e^{2n}+e^n e^{-n}+e^{-2n})}{e^n-e^{-n}}=e^{2n}+e^n e^{-n}+e^{-2n}$
$=e^{2n}+1+e^{-2n}$

❸ $ax^2+by^2+cz^2+dxy+eyz+fzx$

❹ 若兩多角形的相當角相等，相當邊成比例，則兩多角形叫做相似多角形

❺ 與平面上一定點等距離之點之軌跡叫做圓。

三 計算或證明題

❶ 100元÷2=50元……丙的所有
(50元−5元)÷2=22.5元……甲的所有
22.5元+5元=27.5元……乙的所有

答：甲 22.5元；乙 27.5元；丙 50元

❷ $\frac{1}{16}\times 8=\frac{1}{2}$ $1-\frac{1}{2}=\frac{1}{2}$ $\frac{1}{2}\div 10=\frac{1}{20}$ $\frac{1}{16}-\frac{1}{20}$

$=\frac{5}{80}-\frac{4}{80}=\frac{1}{80}$　$1\div\frac{1}{80}=80$　答：父一人獨做這工程需要80日

❸ 設此五數爲 $a-2d$, $a-d$, $a$, $a+d$, $a+2d$, 則

$$\begin{cases} a-2d+a-d+a+a+d+a+2d=40 & ① \\ (a-2d)^2+(a-d)^2+a^2+(a+d)^2+(a+2d)^2=410 & ② \end{cases}$$

由①得$5a=40$ $\therefore a=8$ 由②得 $5a^2+10d^2=410$ $a^2+2d^2=82$ 代入$a=8$,
$64+2d^2=82$ $2d^2=18$ $d^2=9$ $\therefore d=\pm 3$ $a=8$, $d=3$時 $a-2d=8-6=2$,
$a-d=8-3=5$, $a=8$, $a+d=8+3=11$, $a+2d=8+6=14$ $a=8$,
$d=-3$時 $a-2d=8+6=14$, $a-d=8+3=11$, $a=8$, $a+d=8-3=5$,
$a+2d=8-6=2$,　答：2, 5, 8, 11, 14

❹ 設甲乙兩站間的距離爲$x$公里，每小時的速度爲$y$公里，依題意得方程式

$$\begin{cases} \frac{40}{y}+\frac{x-40}{y-4}-1=\frac{x}{y} & ① \\ \frac{x}{y-4}-1-\frac{1}{2}=\frac{x}{y} & ② \end{cases}$$

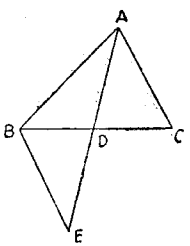
①−② $\frac{40}{y}-\frac{40}{y-4}+\frac{1}{2}=0$　$80(y-4)-80y+y(y-4)=0$

$y^2-4y-320=0$　$(y+16)(y-20)=0$　因爲 $y+16>0$ $\therefore y-20=0$

$y=20$, 把此值代入②，得 $\frac{x}{16}-\frac{3}{2}=\frac{x}{20}$　$5x-120=4x$　$\therefore x=120$

答：甲乙兩地間的距離是120公里

❺



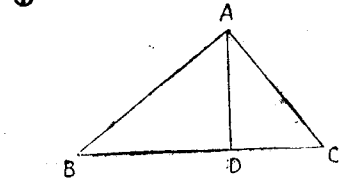

〔已知〕 $\triangle ABC$中, $BD=DC$

〔求證〕 $\frac{1}{2}(AB+AC-BC)<AD<\frac{1}{2}(AB+AC)$

〔證明〕 於$\triangle ABD$, $AB-BD<AD$ ①
於$\triangle ACD$ $AC-CD<AD$ ②
①+② $AB+AC-BC<2AD$
$\therefore \frac{1}{2}(AB+AC-BC)<AD$

延長$AD$到 $E$. 使$DE=AD$, 聯結$BE$, 則$AD=DE$,
$DC=BD$, $\angle ADC=\angle BDE$ $\therefore \triangle ADC\equiv\triangle BDE$ $\therefore AC=BE$,
於$\triangle ABE$, $AE<AB+BE$ $2AD<AB+AC$ $\therefore AD<\frac{1}{2}(AB+AC)$

❻

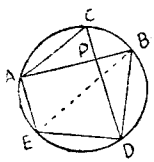



〔已知〕 $\triangle ABC$內 $\angle BAC=\angle R$,
$AD\perp BC$

〔求證〕 $\overline{AD}^2=BD\cdot DC$

〔證明〕 於$\triangle ADB$, $\triangle ADC$
$\angle ADB=\angle ADC$
$\angle BAD=\angle ACD$
(各爲$\angle CAD$之餘角)

$\therefore \triangle ADB\sim\triangle ADC$ $\therefore BD:AD=AD:DC$ $\therefore \overline{AD}^2=BD\cdot DC$

❼ 


〔已知〕 二弦$AB$, $CD$正交於$P$,$d$爲圓之直徑

〔求證〕 $\overline{AP}^2+\overline{BP}^2+\overline{CP}^2+\overline{DP}^2=d^2$

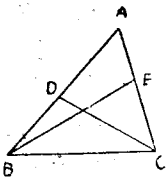
〔證明〕 過$A$, 作弦$AE$, 平行於$CD$, 聯結$ED$, $EB$

則$ED=AC$ $\angle EDB=2\angle R-\angle EAB=2\angle R-\angle DPB=2\angle R-\angle R=\angle R$ ∴ $EB=d$

$\overline{AP}^2+\overline{BP}^2+\overline{CP}^2+\overline{DP}^2=(\overline{AP}^2+\overline{CP}^2)+(\overline{BP}^2+\overline{DP}^2)=\overline{AC}^2+\overline{BD}^2=\overline{ED}^2+\overline{BD}^2=\overline{BE}^2=d^2$

## 省立臺中第二中學

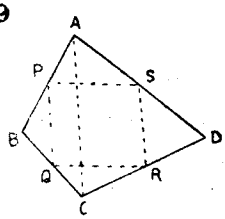
I 幾何

❶ 


〔已知〕 $\triangle ABC$的兩邊$AB$, 及$AC$上，順次取$D$及$E$兩點，使 $BD=CE$, 又 $BE>CD$

〔求證〕 $AB>AC$

〔證明〕 於$\triangle BCE$, $\triangle BCD$, $BC$爲共通，$CE=BD$ $BE>CD$ ∴ $\angle BCE>\angle CBD$ 即 $\angle BCA>\angle CBA$ 於$\triangle ABC$, $\angle BCA>\angle CBA$ ∴$AB>AC$

❷ 

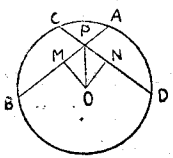

〔已知〕 於四邊形 $ABCD$, $P$, $Q$ $R$, $S$ 順次爲$AB$, $BC$, $CD$, $DA$的中點，

〔求是〕 $PQRS$ 是平行四邊形

〔證明〕 於 $\triangle ABC$, $AP=PB$, $CQ=QB$

∴ $PQ\parallel\frac{1}{2}AC$ 同樣可證 $SR\parallel\frac{1}{2}AC$

∴$PQ\parallel SR$ 一双對邊平行而且相等，所以 $PQRS$ 是平行四邊形。

❸ 

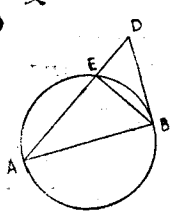

〔已知〕 $AB=CD$ $AB$, $CD$ 交於$P$

〔求證〕 $BP=DP$, $AP=CP$

〔證明〕 作 $OM\perp AB$, $ON\perp CD$, 則 $OM=ON$, $BM=DN$ (因爲 $AB=CD$) 於$\triangle OPM$, $\triangle OPN$, $OM=ON$, $OP$爲共通 $\angle OMP=\angle ONP=\angle R$ ∴ $\triangle OPM\equiv\triangle OPN$

∴ $MP=NP$, 因此， $BM+MP=DN+NP$ 即 $BP=DP$

又 $AB-BP=CD-DP$ 即 $AP=CP$

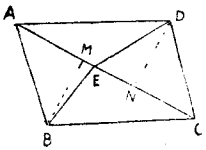
❹ 


〔已知〕 $AB$是直徑，$BD$是切線，$E$是$AD$和圓之交點。

〔求證〕 $\overline{AB}^2=AE\cdot AD$

〔證明〕 於$\triangle ABE$, $\triangle AFD$, $\angle AEB=\angle ABD=\angle R$, $\angle A$爲共通∴ $\triangle ABE\backsim\triangle ABD$,

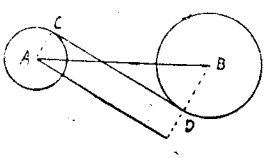
∴ $AB:AD=AE:AB$ ∴ $\overline{AB}^2=AE\cdot AD$

❺ 


〔已知〕 $E$是$\square ABCD$的對角線$AC$上任一點，

〔求證〕 $\triangle AEB=\triangle ADE$

〔證明〕 作$BM\perp AC$, $DN\perp AC$, 則 $AB=CD$, $\angle BAM=\angle DCN$ $\angle AMB=\angle CND=\angle R$ $\therefore$ $\triangle BAM\equiv\triangle DCN$ $\therefore$ $BM=DN$, $\triangle AEB$和$\triangle ADE$之底邊$AE$爲共通，而且其高$BM$和$DN$相等，因此，$\triangle AEB=\triangle ADE$

❻ 


〔題意〕 二圓$A$, $B$之圓心距離$AB$爲 17，半徑$AC=3$, $BD=5$, 求內公切線$CD$之長。

〔解〕 過$A$, 作$CD$之平行線$AE$, 使與$BD$之延長線交於$E$,則$ACDE$爲矩形，$\therefore AE=CD$, $ED=AC=3$ $\therefore BE=BD+ED=5+3=8$, 於$\triangle ABE$, $\angle E=\angle R$ $\therefore$ $AE=\sqrt{AB^2-BE^2}$ $=\sqrt{17^2-8^2}=\sqrt{289-64}=\sqrt{225}=15$ $\therefore$ $CD=15$

答：15

## I 代數

❶ $(x^2-9)(x^2+4x+4)-(x^2-6x+9)(x^2-4)$
$=(x-3)(x+3)(x+2)^2-(x-3)^2(x-2)(x+2)$
$=(x-3)(x+2)[(x+3)(x+2)-(x-3)(x-2)]$
$=(x-3)(x+2)[x^2+5x+6-x^2+5x-6]$
$=(x-3)(x+2)(10x)=10x(x-3)(x+2)$

答：$10x(x-3)(x+2)$

❷ $\frac{1}{x-2}-\frac{1}{x-1}=\frac{1}{x-4}-\frac{1}{x-3}$ $\frac{(x-1)-(x-2)}{(x-2)(x-1)}=\frac{x-3-(x-4)}{(x-4)(x-3)}$

$\frac{1}{(x-2)(x-1)}=\frac{1}{(x-4)(x-3)}$ $(x-2)(x-1)=(x-4)(x-3)$

$x^2-3x+2=x^2-7x+12$ $7x-3x=12-2$ $4x=10$ $x=2.5$ 此值不使原方程式之分母爲0, 故可適合此方程式 答：$x=2.5$

❸ $\sqrt{x+7}-\sqrt{5(x-2)}=3$ 兩邊平方 $x+7-\sqrt{5(x-2)}=9$

$x-2=\sqrt{5(x-2)}$ 兩邊再平方$(x-2)^2=5(x-2)$ $(x-2)^2-5(x-2)=0$
$(x-2)(x-2-5)=0$ $(x-2)(x-7)=0$ $\therefore x=2, 7$ 驗算後知兩根都可適合原方程式。 答：$x=2, 7$

❹ $ax^2+bx+c=0$ (但$a\neq 0$) $x^2+\frac{b}{a}x+\frac{c}{a}=0$ $x^2+\frac{b}{a}x=-\frac{c}{a}$

$x^2+\frac{b}{a}x+\left(\frac{b}{2a}\right)^2=\left(\frac{b}{2a}\right)^2-\frac{c}{a}$ $\left(x+\frac{b}{2a}\right)^2=\frac{b^2-4ac}{4a^2}$

$x+\frac{b}{2a}=\frac{\pm\sqrt{b^2-4ac}}{2a}$ $\therefore$ $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

討論設 $a$, $b$, $c$ 是實數

Ⅰ $b^2-4ac>0$時，此方程式有不等之二實根

Ⅱ $b^2-4ac=0$時，此方程式有相等之二實根

Ⅲ $b^2-4ac<0$時，此方程式有共軛之二虛根

❺ 設風速每小時爲 $x$ 公里，依題意得方程式

$$\frac{150}{80+x}+\frac{150}{80-x}=4 \quad \text{解之，} \quad \frac{75}{80+x}+\frac{75}{80-x}=2$$

$$75(80-x)+75(80+x)=2(80+x)(80-x)$$

$$6000-75x+6000+75x=12800-2x^2 \quad 2x^2=800 \quad x^2=400 \quad x=\pm 20$$

因 $x>0$，故要捨去 $-20$ 而 $x=20$不使原方程式之分母爲 0，故可適合

答：風速每時20公里

❻ 因此三數成幾何級數，故可用 $\frac{a}{\beta}$, $a$, $a\beta$ 來表示，依題意得下列二方程式：

$$\begin{cases} \frac{a}{\beta}+\beta+a\beta=7\cdots\cdots① \\ \frac{a}{\beta}+1+a\beta+4=2(a+3)\cdots\cdots② \end{cases}$$

化簡 ② $\frac{a}{\beta}-2a+a\beta=1\cdots\cdots③$ ①−③ $3a=6$ $\therefore a=2$

代入 ① $\frac{2}{\beta}+2+2\beta=7$ $2+2\beta+2\beta^2=7\beta$ $2\beta^2-5\beta+2=0$

$(2\beta-1)(\beta-2)=0$ $\therefore \beta=\frac{1}{2}$ 或 $\beta=2$，$\beta=\frac{1}{2}$時 $\frac{a}{\beta}=\frac{2}{\frac{1}{2}}=4$

$a\beta=2\times\frac{1}{2}=1$ $\beta=2$時，$\frac{a}{\beta}=\frac{2}{2}=1$, $a\beta=2\times 2=4$ 故此三數爲 4, 2, 1 或 1, 2, 4 答：4, 2, 1 或 1, 2, 4

注意 $4+1=5$, $2+3=5$, $1+4=5$, 這是公差爲0的特殊等差級數。

Ⅱ 算術

❶ 甲 $3\times[6+2\times 3-(5+4)]-8\div 4=3\times[6+6-9]-2$

$=3\times 3-2=9-2=7$ 答：7

乙 $$\frac{1+\frac{1}{2}}{2+\frac{1}{3}}=\frac{1+\frac{1}{2}}{2+\frac{1}{12}}=\frac{12(1+\frac{1}{2})}{12(2+\frac{1}{12})}=\frac{12+6}{24+1}=\frac{18}{25}$$

答：$\frac{18}{25}$

❷ 假定木工1人的工資爲 1，那麼泥工 1 人的工資可用 $\frac{4}{5}$ 來表示，木工6人的工資比泥工 8 人的工資少

$\frac{4}{5}\times 8-1\times 6=\frac{32}{5}-6=6\frac{2}{5}-6=\frac{2}{5}$ 相當於6元，因此，

木工1人的工資是6元$\div\frac{2}{5}=\overset{3}{6}$元$\times\frac{5}{\underset{1}{2}}$=15元　泥工1人的工資是

$15$元$\times\frac{\overset{3}{4}}{\underset{1}{5}}=12$元

答：木工15元，泥工12元

❸ $1:\frac{1}{3}=3:1$

甲 乙 丙
3 : 1
　5 : 3
15 : 5 : 3

15+5+3=23
138元÷23=6元
6元×15=90元……甲的所得
6元×5=30元……乙的所得
6元×3=18元……丙的所得

答：甲得90元，乙得30元，丙得18元

## 省立臺中女子中學

❶ (a) $\dfrac{x-3}{x-3-\dfrac{x}{x-\dfrac{x-1}{x-3}}}=\dfrac{x-3}{x-3-\dfrac{x(x-3)}{x(x-3)-(x-1)}}=\dfrac{x-3}{(x-3)\left(1-\dfrac{x}{x^2-4x+1}\right)}$

$=\dfrac{1}{1-\dfrac{x}{x^2-4x+1}}=\dfrac{x^2-4x+1}{x^2-4x+1-x}=\dfrac{x^2-4x+1}{x^2-5x+1}$　答：$\dfrac{x^2-4x+1}{x^2-5x+1}$

(b) $\dfrac{x^2-5}{x^2+3}+\dfrac{x^2+3}{x^2-5}+2=0$　設$\dfrac{x^2-5}{x^2+3}=y$　則 $y+\dfrac{1}{y}+2=0$

$y^2+1+2y=0$　$(y+1)^2=0$　$\therefore y=-1$　即 $\dfrac{x^2-5}{x^2+3}=-1$

$x^2-5=-(x^2+3)$　$2x^2=2$　$x^2=1$　$x=\pm1$　此二根都不使原方程式之分母爲0，

答：$x=1,\ -1$

❷ 假定此方程式爲 $ax^2+bx+c=0$，姊姊看錯了一次項的係數，求得二根爲$-2$及$-3$，故$\dfrac{c}{a}=(-2)(-3)=6$，即$c=6a$ 妹妹看錯了常數項求得二根爲$-1$及6，

故$-\dfrac{b}{a}=(-1)+6=5$　即 $b=-5a$，因此，原方程式爲 $ax^2-5ax+6a=0$

即$x^2-5x+6=0$　$(x-2)(x-3)=0$，故得眞正的二根爲 $x=2,\ 3$

答：眞正的二根爲 2, 3

❸ 設所求的童子人數爲 $n$，依題意得下面方程式

$\dfrac{n\{2\times10+5(n-1)\}}{2}=100$　解之 $n(20+5n-5)=200$　$5n^2+15n-200=0$

$n^2+3n-40=0$　$(n-5)(n+8)=0$　$n>0$ $\therefore n+8>0$　$\therefore n-5=0$　$\therefore n=5$

答：童子 5 人

❶ 設每小時划行速度，水流速度，步行速度分別爲 $x$ 公里，$y$ 公里，$z$ 公里，依題意得下列聯立方程式：

$$\begin{cases} \frac{6}{x+y}+\frac{6}{z}=2\frac{1}{2}\cdots\cdots① \\ \frac{6}{x-y}+\frac{6}{z}=3\frac{1}{2}\cdots\cdots② \\ \frac{6}{x}+\frac{6}{z}=2\frac{5}{6}\cdots\cdots③ \end{cases} \qquad ②-① \ \frac{6}{x+y}-\frac{6}{x-y}=-1 \ ④ \qquad ③-① \ \frac{6}{x}-\frac{6}{x+y}=\frac{1}{3} \ ⑤$$

由 ⑤ $18(x+y)-18x=x(x+y)$ $18y=x(x+y)\cdots\cdots⑥$

由 ④ $6(x-y)-6(x+y)=-(x+y)(x-y)$ $12y=x^2-y^2\cdots\cdots⑦$ ⑥÷⑦

$\frac{3}{2}=\frac{x^2+xy}{x^2-y^2}$ $3(x^2-y^2)=2(x^2+xy)$ $x^2-2xy-3y^2=0$ $(x-3y)(x+y)=0$

$x+y>0$ $\therefore x-3y=0$ 即 $x=3y$ 代入 ⑦ $12y^2=9y^2-y^2$ $12y=8y^2$ $y\neq 0$

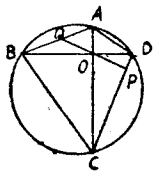
$\therefore y=\frac{3}{2}$ $\therefore x=\frac{9}{2}$ 再代入 ③ $\frac{6}{\frac{9}{2}}+\frac{6}{2}=\frac{17}{6}$ $\frac{4}{3}+\frac{6}{Z}=\frac{17}{6}$

$\frac{6}{Z}=\frac{9}{6}$ $9Z=36$ $\therefore Z=4$

答：划行速度4.5公里，水流速度1.5公里，步行速度4公里

❺ $a^2-\frac{22}{7}\left(\frac{a}{2}\right)^2=a^2-\frac{11}{14}a^2=\frac{3}{14}a^2$ 答：$\frac{3}{14}$ $a^2$平方尺

❻




〔已知〕 $ABCD$是圓內接四邊形，$AC\perp BD$, $OP\perp CD$

〔試證〕 $AQ=BQ$

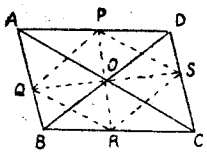
〔證明〕 $\angle ACD=\angle R-\angle COP=\angle DOP=\angle BOQ$

又$\angle ACD=\angle ABD$ $\therefore\angle BOQ=\angle ABD$

即$\angle BOQ=\angle OBQ$ $\therefore BQ=OQ$

同樣可證 $AQ=OQ$ $\therefore AQ=BQ$

❼




〔已知〕 $ABCD$ 是平行四邊形，O是二對角線 $AC$, $BD$的交點，過O之二直線 $PR$, $QS$ 互相垂直。

〔試證〕 $PQRS$ 是菱形。

〔證明〕 於$\triangle AOP$, $\triangle COR$ $AO=CO$, $\angle AOP=\angle COR$, $\angle OAP=\angle OCR$

$\therefore\triangle AOP\equiv\triangle COR$ $\therefore OP=OR$ 同樣可證 $OQ=OS$ 而且 $PR\perp QS$ 四邊形$PQRS$ 之二對角線互相垂直平分，故此四邊形是菱形。

## 省立臺中農業職業學校

一 計算題

❶ (a) $3+(-\frac{1}{2})-\frac{1}{3}\times(-\frac{1}{4})+\frac{1}{6}\div(-\frac{1}{3})=2\frac{1}{2}+\frac{1}{12}-\frac{1}{2}=2\frac{1}{12}$ 答：$2\frac{1}{12}$

(b) $\frac{7}{10}-\left\{\frac{4}{13}\times\frac{5}{8}+\frac{1}{12}\div\left[\frac{3}{4}-\left(\frac{5}{6}-\frac{2}{3}\right)+\frac{1}{9}\right]\right\}=\frac{7}{10}-\left\{\frac{5}{26}+\frac{1}{12}\div\left[\frac{3}{4}-\frac{1}{6}\right.\right.$

$$-\frac{1}{9}\Big\}\Big\}=\frac{7}{10}-\Big\{\frac{5}{26}+\frac{1}{12}\div\Big(\frac{27}{36}-\frac{6}{36}+\frac{4}{36}\Big)\Big\}=\frac{7}{10}-\Big\{\frac{5}{26}+\frac{1}{12}\div\frac{25}{36}\Big\}$$

$$=\frac{7}{10}-\Big\{\frac{5}{26}+\frac{1}{12}\times\frac{36}{25}\Big\}=\frac{7}{10}-\Big\{\frac{5}{26}+\frac{3}{25}\Big\}=\frac{910}{1300}-\Big\{\frac{250}{1300}+\frac{156}{1300}\Big\}$$

$$=\frac{504}{1300}=\frac{126}{325}\qquad \text{答：}\frac{126}{325}$$

❷

| | | | |
|---|---|---|---|
| 9) | 72 | 90 | 162 |
| 2) | 8 | 10 | 18 |
| | 4 | 5 | 9 |

$9\times2\times4\times5\times9=3240$　　答：3240

❸ $$\frac{1}{x}-\frac{1}{x+\dfrac{1}{3x-\dfrac{1}{x}}}=\frac{1}{x}-\frac{1}{x+\dfrac{x}{3x^2-1}}=\frac{1}{x}-\frac{3x^2-1}{3x^3-x+x}$$

$$=\frac{1}{x}-\frac{3x^2-1}{3x^3}=\frac{3x^2}{3x^2}-\frac{3x^2-1}{3x^3}=\frac{1}{3x^3}\qquad \text{答：}\frac{1}{3x^3}$$

❹ (a) $24x^2-29xy-4y^2=(3x-4y)(8x+y)$　　答：$(3x-4y)(8x+y)$

(b) $x^3-3x+2=x^3-x-2x+2=x(x^2-1)-2(x-1)$

$=x(x-1)(x+1)-2(x-1)=(x-1)(x^2+x-2)$

$=(x-1)(x-1)(x+2)=(x-1)^2(x+2)$　　答：$(x-1)^2(x+2)$

❺ (a) $\begin{cases}x^2+y^2=185 & ①\\ x+y=17 & ②\end{cases}$　由①得　$(x+y)^2-2xy=185$　③

②代入③　$289-2xy=185$

$-2xy=-104$　$xy=52$　④　解②，④得　$x=4,\ y=13$

或 $x=18,\ y=4$　　答：$\begin{cases}x=4\\y=13\end{cases}$　$\begin{cases}x=13\\y=4\end{cases}$

(b) $2\sqrt{3-7x}-3\sqrt{8x-12}=0$　$2\sqrt{3-7x}=3\sqrt{8x-12}$

$4(3-7x)=9(8x-12)$　$12-28x=72x-108$　$-100x=-120$

$\therefore x=\frac{6}{5}$

檢算 $2\sqrt{3-7x}-3\sqrt{8x-12}=2\sqrt{3-7\times\frac{6}{5}}-3\sqrt{8\times\frac{6}{5}-12}$

$=2\sqrt{\frac{15-42}{5}}-3\sqrt{\frac{48-60}{5}}=2\sqrt{\frac{-27}{5}}-3\sqrt{\frac{-12}{5}}=\sqrt{\frac{4(-27)}{5}}$

$-\sqrt{\frac{9(-12)}{5}}=\sqrt{\frac{-108}{5}}-\sqrt{\frac{-108}{5}}=0$

可適合　　答：$x=\frac{6}{5}$

## 二、應用題

❶ $2\times42=84$　$108-84=24$　$4-2=2$　$24\div2=12$……龜的隻數

$42-12=30$……鶴的隻數　　答：龜12隻，鶴30隻

❷ 於$\triangle ABC$，$\angle ACB=\angle R$，$CD\perp AB$　$\therefore \overline{AC}^2=AD\cdot AB$　$15^2=18\cdot AD$

$$\therefore AD=\frac{5\cdot 5}{\frac{18}{5}\times\frac{18}{5}}=\frac{25}{2}=12.5$$

答：12.5寸

❸ $AE=\frac{1}{2}(AB-DC)=\frac{1}{2}(56-40)=8$ $h=\sqrt{AD^2-AE^2}$

$=\sqrt{24^2-8^2}=\sqrt{576-64}=\sqrt{512}=\sqrt{16^2\times 2}=16\sqrt{2}$

答：$16\sqrt{2}$寸

❹ 設父之年齡$x$歲，子之年齡$y$歲，依題意得方程式

$$\begin{cases} x+y=100 \ ① & \text{由①得 } y=100-x \ ③ \\ \frac{1}{10}xy-x=180 \ ② & ③\text{代入②} \ \frac{1}{10}x(100-x)-x=180 \end{cases}$$

$x(100-x)-10x=1800$ $100x-x^2-10x=1800$ $-x^2+90x-1800=0$

$x^2-90x+1800=0$ $(x-30)(x-60)=0$ $\therefore x=60$或 30 $x=60$時

$y=100-60=40$ $x=30$時 $y=100-30=70$ $y>x$ 不適合題意

答：父60歲，子40歲

❺ 設男工1人獨做要$x$日完工，童工一人獨做要$y$日完工，依題意得方程式

$$\begin{cases} 15\left(\frac{1}{x}+\frac{1}{y}\right)=1 \ ① & \text{由①得 } \frac{15}{x}+\frac{15}{y}=1 \ ③ \\ 2\left(\frac{7}{x}+\frac{9}{y}\right)=1 \ ② & \text{由②得 } \frac{14}{x}+\frac{18}{y}=1 \ ④ \end{cases}$$

③$\times 6-$④$\times 5$ $\frac{20}{x}=1$ $\therefore x=20$ 代入 ③ $\frac{15}{20}+\frac{15}{y}=1$

$\frac{3}{4}+\frac{15}{y}=1$ $\frac{15}{y}=\frac{1}{4}$ $\therefore y=60$

答：男工1人獨做要20日，童工1人獨做要60日

## 省立臺中高級工業職業學校

**I** 300元$-$250元$=$50元……利息

50元$\div$(250元$\times$32%)$=6\frac{1}{4}$(年)……時期

$6\frac{1}{4}$年$=$6年3月　　答：6年3月後

**I** 設$\frac{a}{b}=\frac{c}{d}=k$，　則$a=bk$，　$c=dk$

$ab+cd:ab-cd=b^2k+d^2k:b^2k-d^2k=k(b^2+d^2):k(b^2-d^2)=b^2+d^2:b^2-d^2$

$a^2+c^2:a^2-c^2=b^2k^2+d^2k^2:b^2k^2-d^2k^2=k^2(b^2+d^2):k^2(b^2-d^2)$

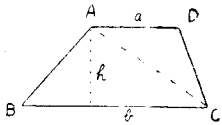
$=b^2+d^2:b^2-d^2$

$\therefore ab+cd:ab-cd=a^2+c^2:a^2-c^2$

Ⅲ $5^x+\frac{1}{5^x}=2$ $(5^x)^2+1=2.5^x$ $(5^x)^2-2.5^x+1=0$ $(5^x-1)^2=0$

$\therefore 5^x=1$ $\therefore x=0$ 答：$x=0$

Ⅳ 〔已知〕 梯形$ABCD$的高$h$及兩底$a,b$.



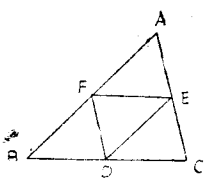

〔求證〕 梯形$ABCD=\frac{1}{2}h(a+b)$

〔證明〕 作對角線$AC$, 因$AD/\!/BC$所以 $\triangle ABC$, $\triangle ACD$的高都等於 $h$ $\triangle ACD=\frac{1}{2}ah$,

$\triangle ABC=\frac{1}{2}bh$ $\therefore$梯形$ABCD=\triangle ACD+\triangle ABC=\frac{1}{2}ah+\frac{1}{2}bh$

$=\frac{1}{2}h\ (a+b)$

Ⅴ




〔已知〕 $\triangle ABC$內, $BD=DC$, $CE=EA$, $AF=FB$

〔求證〕 $\triangle DEF\backsim\triangle ABC$

〔證明〕 於$\triangle ABC$, $AF=FB$, $AE=EC$,

$\therefore EF=\frac{1}{2}BC$, 同樣可證 $FD=\frac{1}{2}CA$,

$DE=\frac{1}{2}AB$, $\therefore DE:EF:FD$

$=\frac{1}{2}AB:\frac{1}{2}BC:\frac{1}{2}CA=AB:BC:CA$ $\therefore\triangle DEF\backsim\triangle ABC$

## 省立臺中商業職業學校

一 選擇

❶ ④ ❷ ② ❸ ④ ❹ ③ ❺ ②

二 算術

❶ (200公尺+220公尺)÷15=420公尺÷15=28公尺 ……甲乙兩列車每秒速度的和

(28公尺+4公尺)÷2=32公尺÷2=16公尺……甲列車每秒的速度

16公尺−4公尺=12公尺……乙列車每秒的速度

答：甲列車每秒16公尺，乙列車每秒12公尺

❷ (400元−50元)÷(1+3+3)=350元÷7=50元……丙的所得

50元×3=150元……乙的所得

150元+50元=200元……甲的所得

答：甲得200元，乙得150元，丙得50元

三 代數

❶ $x^2-2x^4+x^3+5x^2-10x+5=x^3(x^2-2x+1)+5(x^2-2x+1)$

$=(x^2-2x+1)(x^3+5)=(x-1)^2(x^3+5)$ 答：$(x-1)^2(x^3+5)$

❷ 設此等差級數之初項爲 $a$, 公差爲 $d$, 則 $\frac{4\{2a+3d\}}{2}=44$ ①

$a+3d=17$……② ②代入①得 $2(a+17)=44$ $a+17=22$ ∴ $a=5$
將此值代入②得 $5+3d=17$ $3d=12$ ∴ $d=4$ 因此，此級數的前三項是
$a=5$, $a+d=5+4=9$, $a+2d=5+8=13$ 答：5, 9, 13

❸ 以$\frac{2}{3}$和$\frac{4}{5}$爲兩根之一元二次方程式是 $(x-\frac{2}{3})(x-\frac{4}{5})=0$,
再變形爲 $(3x-2)(5x-4)=0$, $15x^2-22x+8=0$
答：$15x^2-22x+8=0$

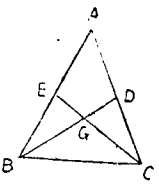
❹ 設其他二邊爲$x$公寸，$y$公寸，依題意得方程式

$$\begin{cases}\frac{1}{2}xy=30\cdots\cdots① & \text{由①得}xy=60\cdots\cdots③\\ x^2+y^2=13^2\cdots\cdots② & ②+③\times2\text{ 得}(x+y)^2=289\end{cases}$$

因爲$x+y>0$ ∴ $x+y=17$……④ 解③,④得 $x=5$, $y=12$,
或$x=12$, $y=5$ 答：5公寸，12公寸

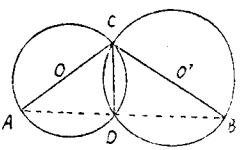
四 幾何

❶




〔已知〕 於$\triangle ABC$, $AD=DC$, $AE=EC$, $BD=CE$
〔求證〕 $AB=AC$
〔證明〕 $BD$和$CE$之交點爲$G$, 則$BG=\frac{2}{3}BD$,
$CG=\frac{2}{3}CE$, 因爲 $BD=CE$, ∴$BG=CG$
∴$\angle BCE=\angle CBD$ 於$\triangle BCE$, $\triangle CBD$,
$BC$爲共通, $\angle BCE=\angle CBD$, $CE=BD$
∴$\triangle BCE=\triangle CBD$ ∴$BE=CD$ $2BE=2CD$ 即$AB=AC$

❷ 〔已知〕 二圓$O$, $O'$ 相交於$C$, $D$, $AC$ 及
$BC$各爲二圓之直徑
〔求證〕 三點 $A,D,B$在一直線上
〔證明〕 連結$CD$, $AD$, $BD$則$\angle ADC=\angle R$
$\angle BDC=\angle R$ ∴$\angle ADB$
$=\angle ADC+\angle BDC=\angle R+\angle R$
$=2\angle R=$平角， 因此，三點$A,D,B$在一直線上




## 省立大甲中學

A. 算術部分

❶ $7\frac{1}{8}-1\frac{11}{16}\times\frac{4}{9}\div4\frac{2}{7}\times\{9\div(1.9+2.9)-1\}$

$=7\frac{1}{8}-\frac{27}{16}\times\frac{4}{9}\div\frac{30}{7}\times\{9\div4.8-1\}=7\frac{1}{8}-\frac{3}{4}-\frac{30}{7}$

$\times\{\frac{9}{4.8}-1\}=7\frac{1}{8}-\frac{6}{8}-\frac{30}{7}\times\left\{\frac{15}{8}-1\right\}=6\frac{3}{8}-\frac{30}{7}$

$\times\frac{1}{8}=6\frac{3}{8}-3\frac{6}{8}=2\frac{5}{8}$　　答：$2\frac{5}{8}$

❷ 設大數爲 $7a$，小數爲 $7b$，則 $a$，$b$ 爲互質數，依題意 得 $7ab=105$，
$\therefore ab=15$　　$a>b$ 且 $a$，$b$ 爲互質數，　$\therefore a=3$　$b=3$，或　$a=15$
$b=1$　　$\therefore 7a=35$，　$7b=21$ 或 $7a=105$，　$7b=7$
答：　35　21 或 105，7

❸ 100個＋90個＝190個　　190個÷$(1+\frac{3}{16})$＝190個÷$\frac{19}{16}$＝160個

$\times\frac{16}{19}$＝160個　　160個－90個＝70個　　答：　70個

❹ 3個×100＝300個，　300個－100個＝200個，　1個÷2＝$\frac{1}{2}$個，
3個－$\frac{1}{2}$個＝$\frac{5}{2}$個，200個÷$\frac{5}{2}$個＝200×$\frac{2}{5}$＝80……小和尚人數

100－80＝20……大和尚人數　　答：　大和尚20人，小和尚80人

*B.* 代數部分

❶ (*a*) $3x^3y^2+6x^2y^2+xy^2+2y^2=y^2(3x^3+6x^2+x+2)=y^2[3x^2(x+2)$
$+(x+2)]=y^2(x+2)(3x^2+1)$

(*b*) $4x^2-16-a^2+b^2-4bx+8a=4x^2-4bx+b^2-(a^2-8a+16)$
$=(2x-b)^2-(a-4)^2=[(2x-b)+(a-4)][(2x-b)-(a-4)]$
$=(2x-b+a-4)(2x-b-a+4)$

答：　(*a*) $y^2(x+2)(3x^2+1)$　　(*b*) $(2x-b+a-4)(2x-b-a+4)$

❷ (*a*) $\begin{cases}\frac{5}{x}+\frac{2}{y}=-1 \cdots\cdots① \\ \frac{3}{x}-\frac{1}{y}=1\frac{3}{5}\cdots\cdots②\end{cases}$　①＋②×2　$\frac{11}{x}=\frac{11}{5}$　$\therefore x=5$

代入①　$\frac{5}{5}+\frac{2}{y}=-1$

$\frac{2}{y}=-2$　　$\therefore y=-1$

(*b*) $2x^{\frac{2}{3}}-x^{\frac{1}{3}}-6=0$　　$(2x^{\frac{1}{3}}+3)(x^{\frac{1}{3}}-2)=0$　　$\therefore 2x^{\frac{1}{3}}+3=0$ 或
$x^{\frac{1}{3}}-2=0$ 即 $x^{\frac{1}{3}}=-\frac{3}{2}$ 或 $x^{\frac{1}{3}}=2$　　$\therefore x=-\frac{27}{8}$ 或 $x=8$

(*c*) $\sqrt{x-2}-\sqrt{2x+3}-2=0$　　$\sqrt{x-2}-2=\sqrt{2x+3}$　兩邊平方
$x-2-4\sqrt{x-2}+4=2x+3$　　$-x-1=4\sqrt{x-2}$　兩邊兩平方
$x^2+2x+1=16x-32$　　$x^2-14x+33=0$　　$(x-3)(x-11)=0$
$\therefore x=3$ 或 11　　$x=3$ 時　$\sqrt{x-2}-\sqrt{2x+3}-2=\sqrt{3-2}$
$-\sqrt{6+3}-2=\sqrt{1}-\sqrt{9}-2=1-3-2=-4$ 不適合，$x=11$
時　$\sqrt{11-2}-\sqrt{22+3}-2=\sqrt{9}-\sqrt{25}-2=3-5-2=-4$

也不適合， 答： (a) $x=5$，$y=-1$ (b) $x=-\frac{27}{8}$，8 (c)無根

❸ $\frac{(138+87)\times 18}{2}=225\times 9=2025$ 答： 2025

❹ $(1.002)^8=(1+0.002)^8=1+8\times 0.002+\frac{8\times 7}{2}\times(0.002)^2+\cdots\cdots=1+0.016+0.000112+\cdots\cdots=1.016112\cdots\cdots$ 答： 1.016

❺ 設兩人原來的體重爲 $x$ 公斤，$y$ 公斤，依題意得方程式

$\begin{cases} x:y=5:6 \cdots\cdots① \\ x+5:y+5=11:13\cdots\cdots② \end{cases}$ 由①得 $5y=6x$ 即 $y=\frac{6}{5}x$ ③

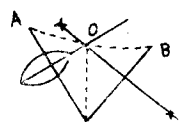
由②得 $11(x+5)=13(x+5)$ $11(\frac{6}{5}x+5)=13(x+5)$

$\frac{66}{5}x+55=13x+65$ $\frac{1}{5}x=10$ ∴ $x=50$ 代入③ 得 $y=60$

答： 50公斤， 60公斤

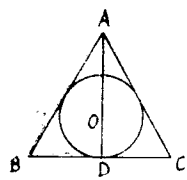
C. 幾何部分

❶ 於 $\triangle ABC$, $\angle C=45°$, $\angle B=90°$ ∴ $\angle A=45°$ ∴ $AB=BC$, 而 $AB=120$公尺 ∴ $BC=120$公尺 答： 120公尺

❷ 


〔作圖〕 聯結 $AC$, $BC$, 作 $AC$, $BC$ 之垂直平分線使其相交於 $O$，則 $O$ 點便合所求。

〔證明〕 聯結 $OA$, $OB$, $OC$, 因爲 $O$ 在 $AC$ 之垂直平分線上 ∴ $OA=OC$, 同樣 $OC=OB$ ∴ $OA=OB=OC$

❸ 


〔已知〕 $\triangle ABC$ 爲圓 $O$ 之外切等邊三角形，$D$ 爲邊 $BC$ 上之切點。

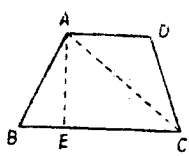
〔求證〕 $AD=3OD$

〔證明〕 $O$ 是 $\triangle ABC$ 之內心，因爲 $\triangle ABC$ 是等邊三角形（即正三角形）故三點 $A,O,D$ 在一直線上，而 $O$ 也就是此三角形之重心

∴ $AO=2OD$ ∴ $AD=3OD$

❹ $\triangle ABI\backsim\triangle A'B'I$ ∴ $AB:A'B'=IC:IC'$ 設 $A'B'=x$尺

則 $6:x=12:0.6$ ∴ $x=\frac{6\times 0.6}{12}=\frac{3.6}{12}=0.3$ 答： 0.3尺




〔已知〕 $AECD$ 爲梯形 ($AD/\!/BC$) $AE$ 爲高

〔求證〕 梯形 $ABCD=\frac{AE(AD+BC)}{2}$

〔證明〕 梯形 $ABCD=\triangle ABC+\triangle ADC$

$=\frac{1}{2}AE\cdot BC+\frac{1}{2}AE\cdot AD$

$=\frac{1}{2}AE(BC+AD)$

❻ 1尺×2×3.14=6.28尺 6.28尺×1200=7536尺

答： 7536尺

# 省立彰化中學

❶ (4個+2個)÷(1−$\frac{1}{2}$)=6個÷$\frac{1}{2}$=6個×2=12個……給甲後的餘數

(12個+1個)÷(1−$\frac{1}{2}$)=13個÷$\frac{1}{2}$=13個×2=26個……原來的果物數

26個−12個=14個……甲的得數　　12個−4個=8個……乙的得數

答：原來的果物26個，甲得14個，乙得8個

❷ a. $\begin{cases}\frac{2}{x}-\frac{3}{y}=\frac{1}{2}\cdots\cdots① \\ \frac{1}{3x}+\frac{1}{5y}=-\frac{1}{5}\cdots\cdots②\end{cases}$　③×15 得 $\frac{5}{x}+\frac{3}{y}=3\cdots\cdots③$

①+③ 得 $\frac{7}{x}=-\frac{7}{2}$　∴ $x=2$

代入① 得 $1-\frac{3}{y}=\frac{1}{2}$　$-\frac{3}{y}=-\frac{1}{2}$　∴ $y=6$

答：$x=2$, $y=6$

b. $\sqrt{x+2}-\sqrt{16-x}=0$　$\sqrt{x+2}=\sqrt{16-x}$　兩邊平方 $x+2=16-x$

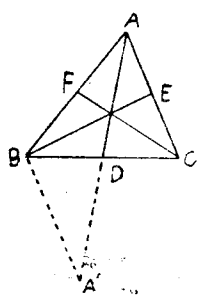
$2x=14$　∴ $x=7$　檢查後知可適合方程式　　答：$x=7$

❸ 此五人的兄弟年齡，依次爲 $(x-6)$ 歲，$(x-3)$ 歲，$x$ 歲，$(x+3)$ 歲，$(x+6)$ 歲，則 $(x-6)+(x-3)+x+(x+3)+(x+6)=45$　即 $5x=45$，∴ $x=9$，

$x-6=9-6=3$，$x-3=9-3=6$，$x+3=9+3=12$，$x+6=9+6=15$

答：3歲，6歲，9歲，12歲，15歲

❹




〔已知〕 於△$ABC$, $AD$, $BE$, $CF$ 爲三中線

〔求證〕 $AD+BE+CF<AB+BC+CA$

〔證明〕 延長$AD$到$A'$，使$AD=DA'$，

則 $AD=DA'$，$\angle ADC=\angle BDA'$，$CD=BD$ ∴△$ADC$≡△$BDA'$

∴$CA=BA'$ 於△$AA'B$ $AB+BA'>AA'$

即 $AB+CA>2AD$……①

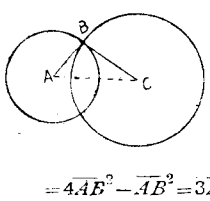
同樣 $AB+BC>2BE$……②

$CA+BC>2CF$……③

①+②+③ $2(AB+BC+CA)>2(AD+BE+CF)$

∴ $AB+BC+CA>AD+BE+CF$　即 $AD+BE+CF<AB+BC+CA$

❺




〔題意〕 圓$A$爲已知圓，$AB$爲其一半徑，欲作一圓，使其面積等於圓$A$的3倍。

〔作圖〕 過$B$，作切線$BC$，在$BC$上，取一點$C$，使$AC=2AB$，用$C$做圓心，$CB$做半徑畫圓，便合所求。

〔證明〕 於△$ABC$，$\angle ABC=\angle R$，

∴$\overline{BC}^2=\overline{AC}^2-\overline{AB}^2=(2AB)^2-\overline{AB}^2$

$=4\overline{AB}^2-\overline{AB}^2=3\overline{AB}^2$　∴圓$C$：圓$A=\overline{BC}^2:\overline{AB}^2=3AB^2:\overline{AB}^2=3:1$

即 圓$C$=3圓$A$

〔討論〕 恒有一解答。

## 省立彰化女子中學

(一) 是非題 ❶ + ❷ + ❸ − 〔註〕$\sqrt{-4}=2i$ ❹ − ❺ + ❻ − ❼ + ❽ − ❾ + 〔註〕$\frac{1+\sqrt{3}\,i}{2}=\frac{(1+\sqrt{3}\,i)(1-\sqrt{3}\,i)}{2(1-\sqrt{3}\,i)}$

$=\frac{1-3i^2}{2(1-\sqrt{3}\,i)}=\frac{1+3}{2(1-\sqrt{3}\,i)}=\frac{4}{2(1-\sqrt{3}\,i)}=\frac{2}{1-\sqrt{3}\,i}$

❿ +

(二) 計算題 ❶ $5-\cfrac{1}{3+\cfrac{2}{4+\cfrac{2}{3}}}=5-\cfrac{1}{3+\cfrac{6}{12+2}}=5-\cfrac{1}{3+\cfrac{6}{14}}$

$=5-\cfrac{1}{3+\cfrac{3}{7}}=5-\cfrac{7}{21+3}=5-\cfrac{7}{24}=4\cfrac{17}{24}$ 答：$4\frac{17}{24}$

❷ 5+4+3=12 96人÷12=8人 8人×5=40人……參加軍中服務隊人數

8人×4=32人……參加農村服務隊人數

8人×3=24人……參加考生服務隊人數

答：參加軍中服務隊40人，農村服務隊32人，考生服務隊24人

❸ (*i*) $xy^2+xz^2+x^2y+x^2z+yz^2+y^2z+3xyz$

$=(xy^2+x^2y+xyz)+(yz^2+y^2z+xyz)+(x^2z+xz^2+xyz)$

$=xy(x+y+z)+yz(x+y+z)+zx(x+y+z)$

$=(x+y+z)(xy+yz+zx)$

(*ii*) $x^6-1=(x^3-1)(x^3+1)=(x-1)(x^2+x+1)(x+1)(x^2-x+1)$

答：(*i*) $(x+y+z)(xy+yz+zx)$ (*ii*) $(x-1)(x^2+x+1)(x+1)(x^2-x+1)$

❹ $\cfrac{\cfrac{a}{a-b}-\cfrac{b}{a+b}}{\cfrac{a}{a+b}+\cfrac{b}{a-b}}=\frac{a(a+b)-b(a-b)}{a(a-b)+b(a+b)}=\frac{a^2+ab-ab+b^2}{a^2-ab+ab+b^2}=\frac{a^2+b^2}{a^2+b^2}=1$

答： 1

❺ 二次方程式 $5x^2+4x+2k-3=0$之二根相等時，其判別式

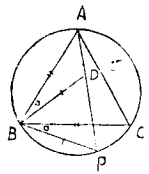
$2^2-5(2k-3)$ 等於 0，即 $4-5(2k-3)=0$ 解之，$4-10k+15=0$

$-10k+19=0$ $-10k=-19$ $\therefore k=\frac{19}{10}=1.9$ 答：$k=1.9$

❻ $\sqrt{a-x}+\sqrt{x-b}=\sqrt{a-b}$ 兩邊平方 得 $a-x+x-b+2\sqrt{a-x}\sqrt{x-b}=a-b$ $2\sqrt{a-x}\sqrt{x-b}=0$ $\therefore a-x=0$ 即 $x=a$ 或 $x-b=0$ 即 $x=b$

檢算後知二根都可適合原方程式 答：$x=a$, $b$,

❼




〔已知〕 $\triangle ABC$爲圓內接正三角形，$P$爲$\overset{\frown}{BC}$上之任一點

〔求證〕 $PA=PB+PC$

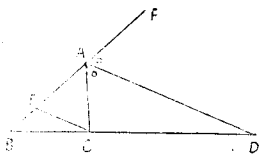
〔證明〕 在$PA$上取一點$D$，使$PD=PB$，則$\triangle BPD$爲正三角形，$(PD=PB,\ \angle BPD=\angle BCA=90°)$

$\therefore BD=BP$，而$\angle DBP=60°$，又$\angle ABC=60°$，

$\therefore \angle ABD=CBP$ 而且 $AB=CB$

$\therefore \triangle ABD\equiv\triangle CBP\ \therefore DA=PC\ \therefore PD+DA=PB+PC$ 即 $PA=PB+PC$

❽

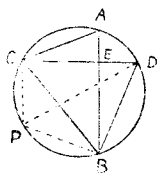



〔已知〕 $AD$平分$\triangle ABC$之外角$A$，交$BC$之延長線於$D$，

〔求證〕 $AB:AC=BD:CD$

〔證明〕 過$C$，作直線$CE$，平行於$DA$，交$AB$於$E$，則 $\angle ACE=\angle CAD$，$\angle AEC=\angle FAD$，已知 $\angle CAD=\angle FDA\ \therefore \angle ACE=\angle AEC\ \therefore AC=AE$ 現在$CE/\!/DA\ \therefore AB:AE=BD:CD\ \therefore AB:AC=BD:CD$

❾




〔已知〕 二弦$AB$，$CD$直交於 $E$，直徑爲$d$

〔求證〕 $\overline{AE}^2+\overline{BE}^2+\overline{CE}^2+\overline{DE}^2=d^2$

〔證明〕 過$C$，作直線$CP$，平行於$AB$，交圓周於$P$，因爲$\angle CEB=\angle R\ \therefore\ \angle DCP=\angle R$，四邊形$DCPB$是圓內接四邊形 $\therefore\ \angle DBP=2\angle R-\angle DCP=2\angle R-\angle R=\angle R$，因此，$DP$爲直徑，其長等於$d$，又 $CP/\!/AB\ \therefore\ AC=PB$，$\overline{AE}^2+\overline{BE}^2+\overline{CE}^2+\overline{DE}^2=(\overline{AE}^2+\overline{CE}^2)+(\overline{BE}^2+\overline{DE}^2)=\overline{AC}^2+\overline{BD}^2=\overline{PB}^2+\overline{BD}^2=\overline{DP}^2=d^2$

## 省立彰化工業職業學校

一 填充

❶ 自變數，常數 ❷ $\frac{5}{6}$ ❸ 等距離 ❹ 外角 ❺ $\pm\sqrt{ab}$，$\frac{a+b}{2}$

❻ 互爲補角 ❼ 4 ❽ $ab$，$a^3b^3c^2d^3$ ❾ 矩形 ❿ 一半

二 算術

❶ 這工人工作5天，得食米33臺斤又6.2元，那末工作5天$\times 8=40$天，可得食米 33臺斤$\times 8=264$臺斤又6.2元$\times 8=49.6$元，

又這工人工作8天，得食米25 臺斤又40.5元，那末工作 8天$\times 5=40$天可得食米 25臺斤$\times 5=125$臺斤又40.5元$\times 5=20.25$元， 因此，可知食米264臺斤$-125$臺斤$=139$臺斤的價是202.5元$-49.6$元$=152.9$元 所以食米1臺斤的價是 152.9元$\div 139=1.1$元 ，又一天之工資是 $(1.1$元$\times 33+6.2$元$)\div 5$

$=8.5$元　　答：食米1臺斤之價1.1元，一天之工資8.5元

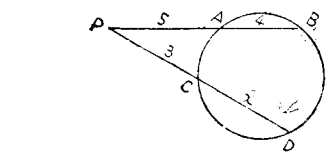
❷ $195075\div\frac{1}{8}\div\frac{1}{6}=9363600$……這數的平方

$\sqrt{9363600}=3060$……這數

| 9363600 | 3060 |
|---|---|
| 9 | 3 |
| 3636 | 3 |
| 3636 | 606 |
| 0 | 6 |

答：這數是3060

三　幾何




假定 $CD=x$寸，由圓冪定理得 $PA\cdot PB=PC\cdot PD$

即 $5(5+4)=3(3+x)$　$45=3(3+x)$　$15=3+x$

$\therefore x=12$　　答：12寸

四　代數

❶ $x^2+2xy^2+y^4-z^6=(x+y^2)^2-z^6=(x+y^2+z^3)(x+y^2-z^3)$

答：$(x+y^2+z^3)(x+y^2-z^3)$

❷ $\begin{cases}(x+y)(x+y+z)=273 & ①\\ (y+z)(x+y+z)=315 & ②\\ (z+x)(x+y+z)=294 & ③\end{cases}$　①+②+③　$2(x+y+z)^2=882$

$(x+y+z)^2=441$　$\therefore x+y+z=\pm21$ ④

④÷①　$x+y=\pm13$ ⑤　④÷②　$y+z=\pm15$ ⑥　④÷③　$z+x=\pm14$ ⑦

④−⑥　$x=\pm6$　④−⑦　$y=\pm7$　④−⑤　$z=\pm8$

答：$\begin{cases}x=6\\y=7\\z=8\end{cases}$　$\begin{cases}x=-6\\y=-7\\z=-8\end{cases}$

❸ $\frac{12\times(2+8)}{2}=\frac{12\times10}{2}=\frac{120}{2}=60$　60寸$=6$尺

答：所需線長共6尺

## 省立彰化商業職業學校

一　是非題

❶ + ❷ + ❸ − ❹ + ❺ − ❻ + ❼ − ❽ − ❾ + ❿ −

二　填充題

❶ 一元一次　❷ $\frac{a+b}{2}$，$\pm\sqrt{ab}$，$\frac{2ab}{a+b}$　❸ $-\frac{-b+\sqrt{b^2-4ac}}{2a}$，$-\frac{-b-\sqrt{b^2-4ac}}{2a}$　❹ $x^2-5x^4y+10x^3y^2-10x^2y^3+5xy^4-y^5$

❺ 3：5　❻ $(2n-4)$直角　❼ $(90-x)$度　❽ 全等　❾ 這線段平行於第三邊，且等於第三邊的一半　❿ 二

## 三 算術

❶ 50元×0.04=2元　2元×0.25=0.5元　2元+0.5元=2.5元
550元÷2.5元=220……他所有的股數
2元×220=440元……股息　　0.5元×220=110元……紅利
答：他共有220股，股息440元，紅利110元

❷ 1角+2角×2+5角×2=15角　　4元+5角=45角
45角÷15角=3……1角輔幣的個數　　3×2=6……2角輔幣的個數
6−1=5……5角輔幣的個數
答：1角輔幣3個，2角輔幣6個，5角輔幣5個

## 四 代數

❶ $2x-17-5\sqrt{2x-3}=0$　$2x-17=5\sqrt{2x-3}$　兩邊平方 $4x^2-68x+289=25(2x-3)$　$4x^2-68x+289=50x-75$　$4x^2-118x+364=0$

$2x^2-59x+182=0$　$(x-26)(2x-7)=0$　∴ $x=26$ 或 $\frac{7}{2}$ 檢算後知只 $x=26$ 可適合原方程式　　答：$x=26$

❷ 設賣出對號票$x$張，不對號票$y$張，則 $\begin{cases} x+y=142 & ① \\ 5x+3y=534 & ② \end{cases}$

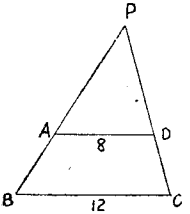
②−①×3　$2x=108$　∴ $x=54$　代入 ①　$54+y=142$　∴ $y=88$
答：對號票54張，不對號票88張

❸ 設 $\frac{x}{a-b}=\frac{y}{b-c}=\frac{z}{c-a}=k$，則 $x=(a-b)k$，$y=(b-c)k$，$z=(c-a)k$

$\therefore cx+ay+bz=c(a-b)k+a(b-c)k+b(c-a)k$
$=k[ca-bc+ab-ca+bc-ab]=0$

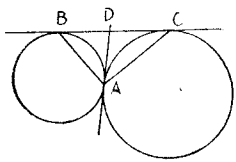
## 五 幾何

❶

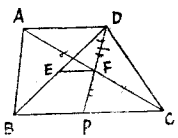



〔解〕梯形$ABCD=90$ $(AD/\!/BC)$ $AD=8$ $BC=12$ 於$\triangle PAD$，$\triangle PBC$，$\angle PAD=\angle PBC$，$\angle P$爲共通 ∴ $\triangle PAD\backsim\triangle PBC$，設$\triangle PAD=S$，則 $\triangle PAD:\triangle PBC=8^2:12^2$　即$S:S+90=64:144$
$S:S+90=4:9$　$9S=4(S+90)$
$9S=4S+360$　$5S=360$　∴ $S=72$
答：72

❷




〔已知〕兩圓外切於$A$，一外公切線切兩圓於$B$,$C$
〔求證〕$\angle BAC=\angle R$
〔證明〕作內公切線 $AD$，交 $BC$ 於 $D$，則 $CD=DA$　$BD=DA$　∴ $DA=CD=DB$ 故 $A$,$B$，$C$ 三點在以$D$爲圓心之同一圓周上，而 $CB$ 爲其一直徑，故半圓之圓周角 $BCA$ 是直角，即$\angle BAC=\angle R$

❽ 


〔已知〕 梯形$ABCD$ $(AD/\!/BC)$中, $DE=EB$, $AF=FC$

〔求證〕 $EF=\frac{1}{2}(BC-AD)$

〔證明〕 聯結$DE$, 延長到$P$,與$BC$相交, 於$\triangle ADF$, $\triangle CPF$, $AF=FC$, $\angle AFD=\angle CFP$, $\angle FAD=\angle FCP$ $\therefore \triangle ADF\equiv\triangle CPF$ $\therefore DF=FP$, $AD=PC$

故$\triangle ADP$, $DE=EB$, $DF=FP$ $\therefore EF=\frac{1}{2}BP=\frac{1}{2}(BC-PC)$

$=\frac{1}{2}(BC-AD)$

## 省立員林中學

I ❶ $x^2+\frac{7}{3}x+\frac{2}{3}=\frac{1}{3}(3x^2+7x+2)=\frac{1}{3}(3x+1)(x+2)$

$=(x+\frac{1}{3})(x+2)$ 答：$(x+\frac{1}{3})(x+2)$

❷ $(x-4)^2-6(x-4)+9=[(x-4)-3]^2=(x-7)^2$ 答：$(x-7)^2$

❸ $\frac{x^2y^2}{9}-\frac{a^2b^2}{16}=\left(\frac{xy}{3}\right)^2-\left(\frac{ab}{4}\right)^2=\left(\frac{xy}{3}+\frac{ab}{4}\right)\left(\frac{xy}{3}-\frac{ab}{4}\right)$

答：$\left(\frac{xy}{3}+\frac{ab}{4}\right)\left(\frac{xy}{3}-\frac{ab}{4}\right)$

❹ $x^4-a^2x^2+2abx-b^2=x^4-(a^2x^2-2abx+b^2)=x^4-(ax-b)^2$

$=(x^2+ax-b)(x^2-ax+b)$ 答：$(x^2+ax-b)(x^2-ax+b)$

II ❶ $\begin{cases}\frac{5}{x-2}+\frac{3}{y-3}=8 & ①\\ \frac{4}{x-2}-\frac{2}{y-3}=2 & ②\end{cases}$ ①×2+②×3 得

$\frac{22}{x-2}=22$ $x-2=1$ $\therefore x=3$

此值代入① $5+\frac{3}{y-3}=8$ $\frac{3}{y-3}=3$ $y-3=1$ $\therefore y=4$

答：$x=3$, $y=4$

❷ $\begin{cases}\frac{1}{x}+\frac{1}{y}=\frac{7}{12} & ①\\ xy=12 & ②\end{cases}$ 由①得 $12(y+x)=7xy$ ③

②代入③ $12(y+x)=7\times12$

$x+y=7$ ④ 解②④得 $x=3$, $y=4$, 或$x=4$, $y=3$

答：$\begin{cases}x=3\\y=4\end{cases}$ $\begin{cases}x=4\\y=3\end{cases}$

❸ $\sqrt{x+1}=x-5$ 兩邊平方 得 $x+1=x^2-10x+25$ $-x^2+11x-24=0$

$x^2-11x+24=0$ $(x-3)(x-8)=0$ $\therefore$ $x=3$ 或8,

$x=3$時, $\sqrt{x+1}=\sqrt{3+1}=\sqrt{4}=2$ $x-5=3-5=-2$ 不適合

$x=8$時, $\sqrt{x+1}=\sqrt{8+1}=\sqrt{9}=3$ $x-5=8-5=3$ 可適合

答：$x=8$

❶ $x^2-(3a+2b)x+6ab=0$ $(x-3a)(x-2b)=0$ ∴ $x-3a=0$ 或 $x-2b=0$
即 $x=3a$ 或 $2b$ 答：$x=3a$ 或 $2b$

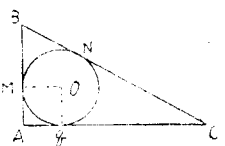
Ⅱ 是非題
❶ − ❷ − ❸ − ❹ + ❺ + ❻ − ❼ − ❽ + ❾ + ❿ −

Ⅲ ❶ $\alpha, \beta$ 爲 $3x^2-4x-1=0$ 之二根， ∴ $\alpha+\beta=\frac{4}{3}$， $\alpha\beta=-\frac{1}{3}$

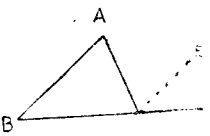
因此，$\frac{\alpha}{\beta}+\frac{\beta}{\alpha}=\frac{\alpha^2+\beta^2}{\alpha\beta}=\frac{(\alpha+\beta)^2-2\alpha\beta}{\alpha\beta}=\frac{\left(\frac{4}{3}\right)^2-2\left(-\frac{1}{3}\right)}{-\frac{1}{3}}$

$=\frac{\frac{16}{9}+\frac{2}{3}}{-\frac{1}{3}}=\frac{16+6}{-3}=-\frac{22}{3}=-7\frac{1}{3}$ 答：$-7\frac{1}{3}$

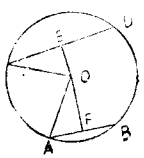
Ⅳ 〔已知〕 於$\triangle AFC$中 $\angle A=\angle R$，內切圓$O$之半徑爲$\gamma$
〔試證〕 $FC+2\gamma=AC+AB$
〔證明〕 邊$AB$, $BC$, $AC$ 上之切點分別爲$M$, $N$, $Q$, 連接$OM$, $OQ$, 則四邊形$OMAQ$爲正方形
∴ $AQ=AM=OM=\gamma$
$AB+AC=AM+BM+AQ+CQ=\gamma+BN+\gamma+CN=BC+2\gamma$




Ⅵ 〔已知〕 $\angle ACD$是$\triangle ABC$之外角
〔求證〕 $\angle ACD=\angle A+\angle B$
〔證明〕 過$C$, 作$CE\parallel AB$ 則 $\angle ECD=\angle B$
$\angle ACE=\angle A$ 邊邊相加 $\angle ECD+\angle ACE$
$=\angle A+\angle B$ ∴$\angle ACD=\angle A+\angle B$




Ⅶ




$O$爲圓心，$OE\perp CD$, $OF\perp AB$, $AB=10$尺, $OF=12$尺
$CD=24$尺 $AF=\frac{1}{2}AB=10$尺 $\times\frac{1}{2}=5$尺
$CE=\frac{1}{2}CD=24$尺 $\times\frac{1}{2}=12$尺 於$\triangle OAF$,
$\angle AFO=\angle R$ ∴$OA=\sqrt{\overline{AF}^2+\overline{OF}^2}=\sqrt{5^2+12^2}$
$=\sqrt{25+144}=\sqrt{169}=13$(尺) $OC=OA=13$尺 於$\triangle OCE$,
$\angle OEC=\angle R$ ∴ $OE=\sqrt{\overline{OC}^2-\overline{CE}^2}=\sqrt{13^2-12^2}=\sqrt{169-144}$
$=\sqrt{25}=5$(尺) 答：5尺

## 省立員林農業職業學校

❶ 假定外層每邊人數爲$x$人，依題意得方程式 $x^2-(x-3\times2)^2=96$
$x^2-(x-6)^2=96$ $x^2-(x^2-12x+36)=96$ $x^2-x^2+12x-36=96$

$12x=132$ $x=11$ 答：11人

❷ ① $4+\cfrac{1}{2-\cfrac{3}{4-\cfrac{5}{6}}}=4+\cfrac{1}{2-\cfrac{18}{24-5}}=4+\cfrac{1}{2-\cfrac{18}{19}}=4+\cfrac{19}{38-18}$

$=4+\cfrac{19}{20}=4\cfrac{19}{20}$ 答：$4\cfrac{19}{20}$

② $x^4-x^3+2x^2-x+1=x^4+2x^2+1-(x^3+x)=(x^2+1)^2-x(x^2+1)$

$=(x^2+1)(x^2+1+x)=(x^2+1)(x^2-x+1)$ 答：$(x^2+1)(x^2-x+1)$

③ $y^2x-y^2+a^2x+2ay-2axy-a^2=y^2(x-1)+a^2(x-1)-2ay(x-1)$

$=(x-1)(y^2+a^2-2ay)=(x-1)(y-a)^2$ 答：$(x-1)(y-a)^2$

❸ 設小數爲 $x$，則大數爲 $x+1$，依題意得方程式 $x^2+(x+1)^2=481$

$x^2+x^2+2x+1-481=0$ $2x^2+2x-480=0$ $x^2+x-240=0$

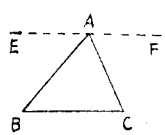
$(x+16)(x-15)=0$ $\therefore x=-16$ 或15 $x=-16$時 $x+1=-15$，$x=15$時 $x+1=16$

答：$-16$，$-15$ 或15，16

❹ $ax^2+bx+c=0$ （但$a\neq0$） $x^2+\cfrac{b}{a}x+\cfrac{c}{a}=0$ $x^2+\cfrac{b}{a}x=-\cfrac{c}{a}$

$x^2+\cfrac{b}{a}x+\left(\cfrac{b}{2a}\right)^2=\left(\cfrac{b}{2a}\right)^2-\cfrac{c}{a}$ $\left(x+\cfrac{b}{2a}\right)^2=\cfrac{b^2-4ac}{4a^2}$

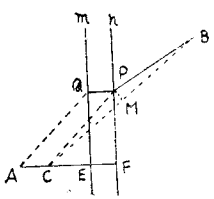
$x+\cfrac{b}{2a}=\cfrac{\pm\sqrt{b^2-4ac}}{2a}$ $\therefore x=\cfrac{-b+\sqrt{b^2-4ac}}{2a}$

❺ 


〔已知〕 任意三角形 $ABC$

〔求證〕 $\angle A+\angle B+\angle C=2\angle R$

〔證明〕 過$A$，作$EAF$，平行於 $BC$，則 $\angle B=\angle BAE$，$\angle C=\angle CAF$ $\therefore\angle A+\angle B+\angle C=\angle BAC+\angle BAE+\angle CAF=$平角$EAF=2\angle R$

❻ 


〔作圖〕 甲家之位置爲$A$，乙家之位置爲 $B$，河之兩岸爲$m$，$n$，則$m/\!/n$ 過$A$，作 $AEF$，垂直於 $m$，與 $m$，$n$ 各交於 $E$，$F$，在此直線上取一點 $C$，使 $AC=EF$，聯結 $CB$，作 $CB$ 之垂直平分線 $MP$，交$n$於 $P$，過 $P$，作$PQ$，垂直於 $m$，交 $m$ 於 $Q$，則 $QP$ 便合所求。

〔證明〕 $AC\perp m$，$QP\perp m$ $\therefore AC/\!/QP$，又 $AC=EF$ $QP=EF$ $\therefore AC=QP$ 於四邊形 $ACPQ$，$AC/\!/QP$ 故此四邊形是平行四邊形，因此，$AQ=CP$，$P$ 在 $CB$ 之垂直平分線上，所以 $CP=BP$ 因此，$AQ=BP$

## 省立斗六中學

I 是非題

❶ ○〔註〕$\sqrt[3]{36288}=\sqrt[3]{12^3\times21}=\sqrt[3]{21}\times12$ ❷ ×〔註〕

$\sqrt{-3}\cdot\sqrt{-4}=\sqrt{3}i\sqrt{4}i=\sqrt{12}i^2=-\sqrt{12}$ ❸ ×

❶ ○ ❺ ×

## Ⅰ 填充題

❶ $\frac{1}{2}$ ❷ $\sqrt{a}-\sqrt{b}i$, $a+b$ ❸ $a+b:a-b=c+d:c-d$

❹ $b-a$ ❺ $-\frac{b}{a}$ ❻ $\sqrt[6]{126}$ 〔註〕$\sqrt{5}=\sqrt[6]{5^3}=\sqrt[6]{125}$

$\sqrt[3]{11}=\sqrt[6]{11^2}=\sqrt[6]{121}$ $\therefore\sqrt[3]{11}<\sqrt{5}<\sqrt[6]{126}$

❼ 此角與對頂角所對二弧度數的半和 ❽ 圓心角 ❾ 此弧上之圓心角

❿ $2\gamma^2$

## Ⅱ 選擇題

❶ ① 〔註〕$\dfrac{1}{2+\dfrac{1}{2+\dfrac{1}{2+\dfrac{1}{2}}}}=\dfrac{1}{2+\dfrac{1}{2+\dfrac{2}{4+1}}}=\dfrac{1}{3+\dfrac{1}{2+\dfrac{2}{5}}}=\dfrac{1}{2+\dfrac{5}{10+2}}$

$=\dfrac{1}{2+\dfrac{5}{12}}=\dfrac{12}{24+5}=\dfrac{12}{29}$ ❷ ③ 〔註〕$\dfrac{a^{-1}b^{-1}}{a^{-1}+b^{-1}}=\dfrac{abab^{-1}b^{-1}}{ab(a^{-1}+b^{-1})}$

$=\dfrac{1}{b+a}$ ❸ ② 〔註〕$1+\dfrac{1}{2}+\dfrac{1}{2^2}+\cdots\cdots=\dfrac{1}{1-\dfrac{1}{2}}=\dfrac{2}{2-1}=2$

❹ ② 〔註〕設周長爲 $4a$, 長爲 $a+x$, 則闊爲 $a-x$, 面積爲 $(a+x)(a-x)$
$=a^2-x^2\leqq a^2$ 故 $x=0$ 即此矩形爲正方形時其面積最大。 ❺ ③〔註〕
$\pi(\sqrt{r^2+R^2})^2=\pi(r^2+R^2)=\pi r^2+\pi R^2$

## Ⅳ 計算題

❶ 70元×3=210元……乙得70元後，甲若得這款項，他的所有仍爲乙所有的3倍

210元−50元=160元……乙得70元後之所有的 $3-1\frac{2}{3}=1\frac{1}{3}$(倍)

160元÷$1\frac{1}{3}$=160元÷$\frac{4}{3}$=160元×$\frac{3}{4}$=120元…乙得70元後之所有

120元−70元=50元……乙的原有金 50元×3=150元……甲的原有金

答： 甲的原有金150元，乙的原有金50元

❷ (a) $a^4+a^2+1=a^4+2a^2+1-a^2=(a^2+1)^2-a^2$
$=(a^2+1+a)(a^2+1-a)=(a^2+a+1)(a^2-a+1)$

(b) $a^2(b-c)+b^2(c-a)+c^2(a-b)=a^2(b-c)+b^2c-ab^2+c^2a-bc^2$
$=a^2(b-c)+bc(b-c)-a(b^2-c^2)=a^2(b-c)+bc(b-c)-a(b-c)(b+c)$
$=(b-c)[a^2+bc-a(b+c)]=(b-c)(a^2+bc-ab-ac)=(b-c)$
$[a(a-b)-c(a-b)]=(a-b)(b-c)(a-c)$

答： (a) $(a^2+a+1)(a^2-a+1)$ (b) $(a-b)(b-c)(a-c)$

❸ $\begin{cases}\frac{1}{x}+\frac{1}{y}=5 \cdots\cdots① \\ \frac{x}{y}+\frac{y}{x}=\frac{13}{6} \cdots\cdots②\end{cases}$ 由②得 $6x^2+6y^2=13xy$

$6x^2-13xy+6y^2=0 \quad (2x-3y)(3x-2y)=0$

$\therefore 2x-3y=0$ 或 $3x-2y=0$ 即 $y=\frac{2}{3}x$

③ 或 $x=\frac{2}{3}y$ ④ ④代入① $\frac{1}{x}+\frac{3}{2x}=5 \quad 2+3=10x \quad 5=10x$

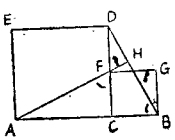
$\therefore x=\frac{1}{2}$ 將此值代入 ③ 得 $y=\frac{1}{3}$ 同樣由①，④得 $y=\frac{1}{2}, \ x=\frac{1}{3}$

答： $\begin{cases}x=\frac{1}{2} \\ y=\frac{1}{3}\end{cases} \quad \begin{cases}x=\frac{1}{3} \\ y=\frac{1}{2}\end{cases}$

❹ 等差級數 1, 3, 5……至第 $n$ 項之總和爲 $\frac{n\{2\times1+(n-1)\times2\}}{2}$

$=\frac{n(2+2n-2)}{2}=\frac{2n^2}{2}=n^2$ 故知此總和爲平方數。

❺




〔已知〕 四邊形 $ACDE$, $CBGF$ 都是正方形

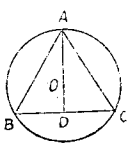
〔求證〕 $AF \perp BD$

〔證明〕 延長 $AF$ 至 $H$ 與 $BD$ 相交，於 $\triangle ACF$, $\triangle DCB$ $\angle ACF=\angle DCB=\angle R$, $AC=DC$, $CF=CB$ $\therefore \triangle ACF \equiv \triangle DCB$,

$\therefore \angle AFC=\angle DBC$, 故四邊形 $BCFH$ 爲圓內接四邊形，

$\therefore \angle DHF=\angle BCF=\angle R$ $\therefore AF \perp BD$

❻




〔解〕 $\triangle ABC$ 爲正三角形，其邊長爲 $a$, 其外接圓之圓心爲 $O$, 聯結 $AO$, 延長至 $D$, 與 $BC$ 相交，則 $AD \perp BC$, $BD=DC$, $AO=\frac{2}{3}AD$

於 $\triangle ABD$, $\angle ADB=\angle R$, $AB=a$, $BD=\frac{a}{2}$,

$\therefore \overline{AD}^2+\left(\frac{a}{2}\right)^2=a^2 \quad \overline{AD}^2=a^2-\frac{a^2}{4}=\frac{3}{4}a^2$

$\therefore AD=\frac{\sqrt{3}}{2}a$ 因此， $\triangle ABC=\frac{1}{2}BC \cdot AD=\frac{1}{2}a\times\frac{\sqrt{3}}{2}a=\frac{\sqrt{3}}{4}a^2$

$AO=\frac{2}{3}AD=\frac{2}{3}\times\frac{\sqrt{3}}{2}a=\frac{\sqrt{3}}{3}a^2$

答： 此正三角形之面積 $\frac{\sqrt{3}}{4}a^2$ 外接圓半徑 $\frac{\sqrt{3}}{3}a$

## 省立嘉義中學

(一) 是非題

❶ 一 〔註〕 $\sqrt{x}+\sqrt{y}$ 之有理化因式爲 $\sqrt{x}-\sqrt{y}$

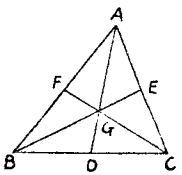
❷ − 〔註〕$i^2=-1$ ❸ + ❹ + ❺ − 〔註〕任何數之零次方等於1
❻ + ❼ + 〔註〕因爲5寸+10寸<18寸 ❽ − ❾ − ❿ −

(二) 填空題

❶ 垂直，平分 ❷ 底，高 ❸ 25, $\frac{1}{25}$, 27, 1 ❹ $\sqrt[12]{432}$ 〔註〕$\sqrt[3]{2}\sqrt[4]{3}=\sqrt[12]{2^4}\sqrt[12]{3^3}=\sqrt[12]{2^4\times3^3}=\sqrt[12]{16\times27}=\sqrt[12]{432}$
❺ 公約數 ❻ $\sqrt{3}$ ❼ 等腰 ❽ 60 ❾ 2 ❿ 同心

(三) 計算題

❶



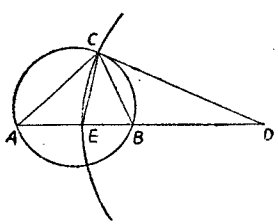

〔已知〕 $AD$, $BE$, $CF$爲$\triangle ABC$之三中線
〔求證〕 $AD+BE+CF>\frac{3}{4}(AB+BC+CA)$
〔證明〕 設重心爲$G$,則$\frac{2}{3}AD=AG$, $\frac{2}{3}BE=BG$,
$\frac{2}{3}CF=CG$ 於$\triangle BGC$, $BG+CG>BC$
即$\frac{2}{3}(BE+CF)>BC$……①

同樣 $\frac{2}{3}(CF+AD)>AC$……② $\frac{2}{3}(AD+BE)>AB$……③

①+②+③$\frac{3}{4}(AD+BE+CF)>AB+BC+CA$

$\therefore$ $AD+BE+CF>\frac{3}{4}(AB+BC+CA)$

❷




〔已知〕 $CD$爲$\triangle ABC$之外接圓之切線，$DC=DE$
〔求證〕 $\angle ACE=\angle BCE$
(證明) $CD$爲切線，$CB$爲過切點$C$之弦
$\therefore$ $\angle DCB=\angle CAC$……①
於 $\triangle DCE$, $DC=DE$,
$\therefore$ $\angle DCE=\angle DEC$……②
②−① $\angle DCE-\angle DCB$
$=\angle DEC-\angle BAC$ 即 $\angle BCE=\angle ACE$

❸ $(a+b+c+d)^2-(a+b-c-d)^2=(a+b+c+d+a+b-c-d)$
$(a+b+c+d-a-b+c+d)=(2a+2b)(2c+2d)=4(a+b)(c+d)$
答：$4(a+b)(c+d)$

❹ $x^2-\frac{35}{6}xy-y^2=\frac{6x^2-35xy-6y^2}{6}=\frac{(6x+y)(x-6y)}{6}$
$=\frac{1}{6}(6x+y)(x-6y)$ 答：$\frac{1}{6}(6x+y)(x-6y)$

❺ $\begin{cases}x^2+y^2=74\cdots\cdots①\\ xy=35\cdots\cdots②\end{cases}$ ①+②×2 $(x+y)^2=144$
$\therefore x+y=12\cdots\cdots③$ 或 $x+y=-12\cdots\cdots④$

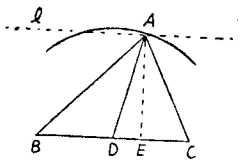
解 ②、③得 $x=5, y=7$ 及 $x=7, y=5$ 解 ②、④得 $x=-5, y=-7$ 及 $x=-7, y=-5$

答：$\begin{cases}x=5\\y=7\end{cases}$ $\begin{cases}x=7\\y=5\end{cases}$ $\begin{cases}x=-5\\y=-7\end{cases}$ $\begin{cases}x=-7\\y=-5\end{cases}$

⑥ $(7-\sqrt{5})+(7+\sqrt{5})=14$ $(7-\sqrt{5})(7+\sqrt{5})$ $=49-5=44$ 故此一元二次方程式爲 $x^2-14x+44=0$

答：$x^2-14x+44=0$

⑦



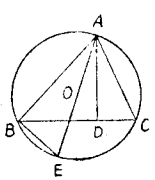

〔題意〕 已知一邊$a$，及在此邊上之高$H_a$，與中線 $M_a$，求作$\triangle ABC$

〔作圖〕 引$BC$，使其長等於$a$，作與 $BC$平行，而其距離爲$H_a$之直線$l$，求$BC$之中點$D$，以$D$爲圓心，$M_a$爲半徑作圓與$l$交於$A$，作 $\triangle ABC$，便合所求。

〔證明〕 依作圖知 $BC=a$, $BD=DC$ $AD=M_a$, 又作 $AE\perp BC$ 時，$AE=H_a$, 故可適合所設條件

〔討論〕 $M_a<H_a$ 時無解，如$BC$之位置爲一定，則 $M_a=H_a$ 時有二解（$BC$之上下各一） $M_a>H_a$ 時有四解，（$BC$之上下各二）

⑧




〔已知〕 $AD$ 爲 $\triangle ABC$ 之高，$AE$ 爲 $\triangle ABC$ 之外接圓直徑，

〔求證〕 $AB\cdot AC=AD\cdot AE$

〔證明〕 於$\triangle ABE$, $\triangle ADC$ $\angle ABE=\angle ADC=\angle R$

$\angle AEB=\angle ACD$ $\therefore$ $\triangle ABE\backsim\triangle ADC$

$\therefore AB:AD=AE:AC$

$\therefore AB\cdot AC=AD\cdot AE$

⑨ 設酒精$x$公升和水1公升混合，則 $0.78x+1=0.925(x+1)$

$0.78x+1=0.925x+0.925$ $0.075=0.145x$ $\therefore$ $x=\dfrac{15}{29}$

$\therefore x:1=\dfrac{15}{29}:1=15:29$ 答：15 : 29

⑩ (a)

$$\begin{array}{r|l}\sqrt{3.} & 1.732\\ \hline 1 & 1\\ \hline 200 & 1\\ 189 & \overline{27}\\ \hline 1100 & 7\\ 1029 & \overline{243}\\ \hline 7100 & 3\\ 6924 & \overline{3462}\\ \hline 176 & 2\end{array}$$

(b) $\sqrt[3]{2.}$

| | | |
|---|---|---|
| 1 | 1.259 | |
| 1000 | 3 | 32 |
| 728 | 64 | 2 |
| 272000 | 364 | 2 |
| 225125 | 4 | 365 |
| 46875000 | 432 | 5 |
| 42491979 | 1825 | 5 |
| 4383021 | 45025 | 3759 |
| | 25 | 9 |
| | 46875 | |
| | 33831 | |
| | 4721331 | |

答：(a)1.732 (b)1.259

## 省立嘉義女子中學

I 是非法

❶ + ❷ + ❸ − 〔註〕$\frac{1}{2}:\frac{1}{3}:\frac{1}{5}=\frac{1}{2}\times30:\frac{1}{3}\times30:\frac{1}{5}\times30=15:10:6$ ❹ + ❺ − 〔註〕時期一定時，利息與本金成比例，本金一定時，利息與時期成比例 ❻ − 〔註〕如果是負數，其絕對值愈大，其值則愈小。 ❼ − ❽ − 〔註〕除數不能爲零 ❾ − 〔註〕二元一次方程式的圖雖然是直線，但是二元二次方程式的圖不一定是直線。 ❿ − ⓫ + ⓬ − ⓭ − 〔註〕$\sqrt{-5}\times\sqrt{-3}=\sqrt{5}i\times\sqrt{3}i=\sqrt{15}i^2=-\sqrt{15}$ ⓮ + 〔註〕譬如$\sqrt{x^2+2x-3}=-6$是無根的。 ⓯ − ⓰ + ⓱ + ⓲ − ⓳ − ⓴ + 〔註〕二外切圓之連心線等於其半徑之和，二內切圓之連心線等於其半徑之差。 ㉑ − ㉒ + ㉓ − 〔註〕因爲$3^2+4^2=5^2$所以這三角形是直角三角形 ㉔ + ㉕ −

I 填充

❶ 度、量、衡 ❷ 帶分數 ❸ 通分 ❹ 反比例 ❺ 折扣 ❻ 絕對值 ❼ 改變 ❽ 恒等式 ❾ 除數 ❿ 合比 ⓫ 同次 ⓬ $a-\sqrt{b}$ ⓭ 0 〔註〕$\frac{1+i}{1-i}+\frac{1-i}{1+i}=\frac{(1+i)^2+(1-i)^2}{(1-i)(1+i)}=\frac{1+2i+i^2+1-2i+i^2}{1-i^2}$

$=\frac{1+2i-1+1-2i-1}{1+1}=0$ ⓮ 等差 ⓯ 其共軛虛根 ⓰ 內心 ⓱ 外心 ⓲ 垂心 ⓳ 圓心及此弦所對之弧的中點 ⓴ 兩條外 ㉑ 兩個 ㉒ 必平行於第三邊 ㉓ 高 ㉔ 圓周率 ㉕ 此圓之半徑

II $72+\{39+[100-(43-76-35)]\}=72+\{39+[100-(43-41)]\}$

$=72+\{39+[100-2]\}=72+\{39+98\}=72+137=209$ 答：209

IV 一元二次方程式之兩根相等時，其判別式必等於0。

$\therefore 2^2-5(2k-3)=0$ $4-10k+15=0$ $-10k=-19$ $k=1.9$ 答：$k=1.9$

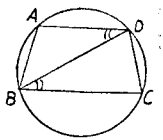
V $\begin{cases} x-y=4\cdots\cdots① \\ x^2+y^2=40\cdots② \end{cases}$ 由①得 $x=y+4$ ③

③代入② $(y+4)^2+y^2=40$， $y^2+8y+16+y^2-40=0$

$2y^2+8y-24=0$ $y^2+4y-12=0$ $(y+6)(y-2)=0$ $\therefore y=-6$ 或2，代入③得 $x=-2$或6

答：$\begin{cases}x=-2\\y=-6\end{cases}$ $\begin{cases}x=6\\y=2\end{cases}$

Ⅵ




〔已知〕 $ABCD$ 爲圓內接梯形 $(AD/\!/BC)$

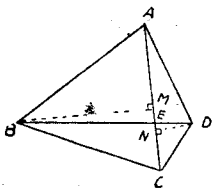
〔求證〕 $AB=DC$

〔證明〕 引對角線$BD$，因爲 $AD/\!/BC$

$\therefore \angle ADB=\angle CBD$ $\therefore \overset{\frown}{AB}=\overset{\frown}{DC}$

$\therefore AB=DC$

Ⅶ




〔已知〕 四邊形 $AECD$ 之對角線 $AC$, $BD$ 相交於$E$

〔求證〕 $\triangle ABC:\triangle CDA=BE:DE$

〔證明〕 作$BM\perp AC$, $DN\perp AC$

則$\triangle ABC:\triangle CDA=BM:DN$ (同底)於

$\triangle BEM$, $\triangle DEN$ $\angle BME=\angle DNE$

$\angle BEM=\angle DEN$ $\therefore \triangle BEM\backsim\triangle DEN$

$\therefore BM:DN=BE:DE$ 因此，$\triangle ABC:\triangle CDA=BE:DE$

## 省立嘉義高級農業職業學校

Ⅰ 算術

❶

| | | |
|---|---|---|
| 170 | 16 | 2822 |
| 102 | 1 | 170 |
| 68 | 1 | 1122 |
| 68 | 2 | 1020 |
| 0 | | 102 |
| | | 68 |
| | | 34 |

$$34)\overline{170}\ 5 \qquad 2822\times 5=14110$$
$$\underline{170}$$
$$0$$

答：最大公約數34，最小公倍數14110

❷ $6\%\div 2=3\%=0.03$ 2年÷0.5年$=4$

3000元$\times(1+0.03)^4=3376.52643$元(小數第三位以下切捨)

答：二年後本利和3376.52元

Ⅰ 代數

❶ $(a)$ $x=7-\sqrt{x^2-7}$ $\sqrt{x^2-7}=7-x$

兩邊平方 $x^2-7=49-14x+x^2$ $14x=56$ $\therefore x=4$

檢算 左邊$=4$ 右邊$=7-\sqrt{16-7}=7-\sqrt{9}=7-3=4$ 可適合

答：$x=4$

$(b)$ $\begin{cases}x^2+y^2=13 & ①\\ xy=6 & ③\end{cases}$ ①+②×2 $(x+y)^2=25$

$\therefore x+y=5$ ③ $x+y=-5$ ④

解 ②,③得 $x=2$, $y=3$, 或 $x=3$, $y=2$

解 ②④得 $x=-2$, $y=-3$, 或 $x=-3$, $y=-2$

答：$\begin{cases}x=2\\y=3\end{cases}$ $\begin{cases}x=3\\y=2\end{cases}$ $\begin{cases}x=-2\\y=-3\end{cases}$ $\begin{cases}x=-3\\y=-2\end{cases}$

❷ (a) $\sqrt{x+5}+\sqrt{x-4}=9$ $\sqrt{x+5}=9-\sqrt{x-4}$

兩邊平方 $x+5=81-18\sqrt{x-4}+x-4$ $18\sqrt{x-4}=72$

$\sqrt{x-4}=4$ 兩邊再平方 $x-4=16$ $\therefore x=20$

檢算 $\sqrt{x+5}+\sqrt{x-4}=\sqrt{20+5}+\sqrt{20-4}=\sqrt{25}+\sqrt{16}$

$=5+4=9$ 可適合 答：$x=20$

(b) $\dfrac{4}{x-2}-\dfrac{1}{x-4}=\dfrac{4}{x^2-6x+8}$ $\dfrac{4}{x-2}-\dfrac{1}{x-4}=\dfrac{4}{(x-2)(x-4)}$

假定 $(x-2)(x-4)\neq 0$, 乘此式於原方程式的兩邊，得

$4(x-4)-(x-2)=4$ $4x-16-x+2=4$ $3x=18$ $\therefore x=6$

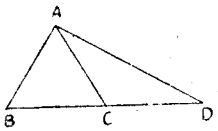
此值可適合 $(x-2)(x-4)\neq 0$ 答：$x=6$

❷ $\log_{10}\dfrac{27}{4}=\log_{10}\dfrac{3^3}{2^2}=3\log_{10}3-2\log_{10}2=3\times 0.47712-2\times 0.30103$

$=0.82930$ 答：0.82930

## I 幾何

❶




〔已知〕 $\triangle ABC$是正三角形， $BC=CD$

〔求證〕 $\angle BAD=\angle R$

〔證明〕 $\triangle ABC$是正三角形 $\therefore \angle BAC=60°$

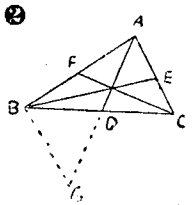
於$\triangle ACD$, $AC=BC=CD$

$\therefore \angle CAD=\angle D$ $\angle CAD+\angle D$

$=\angle ACB=60°$ $\therefore \angle CAD=60°\div 2$

$=30°$ $\therefore$ $\angle BAD=\angle BAC+\angle CAD=60°+30°=90°=\angle R$

❷




〔已知〕 $AD$, $BE$, $CF$爲$\triangle ABC$之三中線

〔求證〕 $AD+BE+CF<AB+BC+CA$

〔證明〕 延長$AD$至$G$, 使 $DG=AD$, 連結$BG$, 則

$\left.\begin{matrix}AD=DG\\DC=BD\\\angle ADC=\angle BDG\end{matrix}\right\}$ $\therefore$ $\triangle ADC\equiv\triangle BDG$

$\therefore$ $AC=BG$ 於 $\triangle ABG$, $AG<AB+BG$ 即

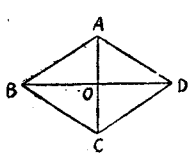
$2AD<AB+AC$……①

同理可證 $2BE<AB+BC$……② $2CF<BC+AC$……③

①+②+③ $2(AD+BE+CF)<2(AB+BC+CA)$

$\therefore AD+BE+CF<AB+BC+CA$

❸




〔已知〕 $ABCD$爲菱形

〔求證〕 $AC\perp BD$

〔證明〕 於$\triangle ABD$, $\triangle CBD$,

$\left.\begin{matrix}AB=CB\\AD=CD\\AD\text{爲共通}\end{matrix}\right\}$ $\therefore\triangle ABD\equiv\triangle CBD$

$\therefore\angle ABD=\angle CBD$

$\triangle ABC$爲等腰三角形，$BD$是其頂角的分角線，故必垂直於其底邊

即 $BD\perp AC$

## 省立嘉義工業職業學校

### 一 算術

❶ $1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{5}}}}=1+\cfrac{1}{2+\cfrac{1}{3+\frac{5}{20+1}}}=1+\cfrac{1}{2+\cfrac{1}{3+\frac{5}{21}}}$

$=1+\cfrac{1}{2+\frac{21}{63+5}}=1+\cfrac{1}{2+\frac{21}{68}}=1+\frac{68}{136+21}=1+\frac{68}{157}=1\frac{68}{157}$

答：$1\frac{68}{157}$

❷ $24.75-24=0.75$　$3\div0.75=4$……乙數　$4\times24+3=99$……甲數

答：甲數99，乙數4

### 二 代數

❶ ① $x^2+6x+5=(x+1)(x+5)$　　答：$(x+1)(x+5)$

② $i^5\times i^4=i^9\times1=i^3=i^2\times i=-i$　　答：$-i$

③ $\frac{a+h-1}{1-a-h}=\frac{-(1-a-h)}{1-a-h}=-1$　　答：$-1$

④ $(2+100)\times50\div2=2550$　　答：2550

⑤ $(-1)^{2m}+(-1)^{2m+1}=1-1=0$　　答：0

❷ $\frac{x-1}{\sqrt{x}-1}=3+\frac{\sqrt{x}+1}{2}$　$\frac{(\sqrt{x}-1)(\sqrt{x}+1)}{\sqrt{x}-1}=3+\frac{\sqrt{x}+1}{2}$

$\sqrt{x}+1=3+\frac{\sqrt{x}+1}{2}$　$2\sqrt{x}+2=6+\sqrt{x}+1$　$\sqrt{x}=5$

$\therefore x=25$　此值可適合原方程式　　答：25

❸ 設此三數爲 $a-d$, $a$, $a+d$, 依題意得方程式

$\begin{cases}(a-d)+a+(a+d)=15 & ①\\ (a-d)^2+a^2+(a+d)^2=93 & ③\end{cases}$　化簡①得 $3a=15$　即 $a=5$

化簡②得 $3a^2+2d^2=93$

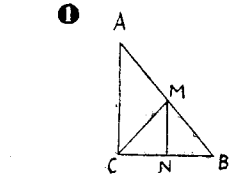
將 $a$ 之值代入此式，$75+2d^2=93$　$2d^2=18$　$d^2=9$　$\therefore d=3$

或 $-3$　故此三數爲 $a-d=5-3=2$,　$a=5$　$a+d=5+3=8$

或 $a-d=5-(-3)=8$,　$a=5$　$a+d=5-3=2$　　答：2, 5, 8

### 三 幾何

❶




〔已知〕 $\triangle ABC$中，$\angle ACB=\angle R$, $MA=MB$

〔求證〕 $MA=MB=MC$

〔證明〕 過 $M$, 作 $MN$, 平行於 $AC$, 交 $CB$ 於 $N$,

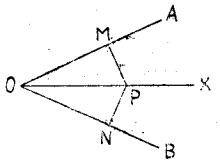
則$\angle MNB=\angle ACB=\angle R$　$CN=BN$

於 $\triangle CMN$, $\triangle BMN$, $MN$爲共通, $CN=BN$,

$\angle MNC=\angle MNB=\angle R$　$\therefore\triangle CMN\equiv\triangle BMN$

$\therefore MC=MB$, 已知 $MA=MB=MC$

❷



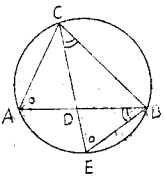

〔已知〕 $\angle AOX=\angle BOX$, $P$爲$OX$上之任一點 $PM\perp OA$, $PN\perp OB$

〔求證〕 $PM=PN$

〔證明〕 於 $\triangle OPM$, $\triangle OPN$,

$OP$ 爲共通, $\angle MOP=\angle NOP$, $\angle OMP=\angle ONP=\angle R$ $\Big\}$ $\therefore \triangle OPM\equiv\triangle OPN$ $\therefore PM=PN$

❸




〔已知〕 $\triangle ABC$中，$\angle ACB$ 的平分線交 $AB$ 於 $D$, 交外接圓於$E$

〔求證〕 $\overline{EB}^2=CE\cdot DE$

〔證明〕 $CE$爲$\angle ACB$的平分線 $\therefore \overset{\frown}{AE}=\overset{\frown}{BE}$

$\therefore \angle EBD=\angle ECB$ $\angle BED=\angle CEB$

$\therefore \triangle EBD\backsim\triangle ECB$ $\therefore DB:EB=EB:CE$

$\therefore \overline{EB}^2=CE\cdot DE$

## 省立嘉義商業職業學校

❶ $$1+\cfrac{1\frac{1}{2}}{2+\cfrac{1}{3+\cfrac{\frac{1}{3}}{4+2\frac{1}{3}}}}=1+\cfrac{1\frac{1}{2}}{2+\cfrac{1}{3+\frac{1}{12+7}}}=1+\cfrac{1\frac{1}{2}}{2+\cfrac{1}{3+\frac{1}{19}}}$$

$$=1+\cfrac{\frac{3}{2}}{2+\frac{19}{57+1}}=1+\cfrac{\frac{3}{2}}{2+\frac{19}{58}}=1+\frac{87}{116+19}=1+\frac{87}{135}=1\frac{29}{45}=1\frac{29}{45}$$

答： $1\frac{29}{45}$

❷ 2.4元×16＝3.84元　　42.6元−38.4元＝4.2元　　4.2元÷0.6元＝7

答： 7 天

❸ $x^3-4xy^2+x^2y-4y^3=x^2(x+y)-4y^2(x+y)=(x+y)(x^2-4y^2)$

$=(x+y)(x+2y)(x-2y)$　　答： $(x+y)(x+2y)(x-2y)$

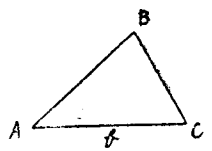
❹ $\begin{cases}2x^2-y^2=23\cdots\cdots①\\4x^2-5y^2=37\cdots\cdots②\end{cases}$　①×2−②　$y^2=9$　$\therefore y=\pm3$

代入①　$2x^2-9=23$　$2x^2=32$　$x^2=16$　$\therefore x=\pm4$

答： $\begin{cases}x=4\\y=3\end{cases}$ $\begin{cases}x=4\\y=-3\end{cases}$ $\begin{cases}x=-4\\y=3\end{cases}$ $\begin{cases}x=-4\\y=-3\end{cases}$

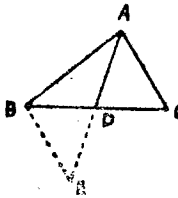
❺ $$\frac{9}{3+\sqrt{6}}=\frac{9(3-\sqrt{6})}{(3+\sqrt{6})(3-\sqrt{6})}=\frac{9(3-\sqrt{6})}{9-6}=\frac{9(3-\sqrt{6})}{3}$$

$=3(3-\sqrt{6})=9-3\sqrt{6}$ 答： $9-3\sqrt{6}$

❶ 


〔作圖〕 先作 $AC$ 等於 $b$，過 $A$，引 $AB$，使 $\angle CAB$ 等於 $\angle A$，過 $C$，引 $CB$，使 $\angle ACB$ 等於 $\angle C$，$AB$，$CB$ 之交點爲 $C$，則 $\triangle ABC$ 就合所求。

〔證明〕 由作圖知 $AC=b$，$\angle CAB=\angle A$ $\angle ACB=\angle C$

❼ 


〔已知〕 於 $\triangle ABC$， $BD=DC$

〔求證〕 $AD<\frac{1}{2}(AB+AC)$

〔證明〕 延長 $AD$ 到 $E$，使 $AD=DE$，聯結 $BE$，則 $AD=DE$， $\angle ADC=\angle EDB$， $DC=BD$ $\therefore$ $\triangle ADC\equiv\triangle EDB$ $\therefore$ $AC=BE$ 於 $\triangle ABE$，

$AE<AB+BE$ $2AD<AB+AC$ $\therefore$ $AD<\frac{1}{2}(AB+AC)$

❽ 請參照試題之插圖 〔已知〕 $AC$，$BD$二弦相交於 $O$，$OE$ 是 $\triangle OCD$ 之外接圓之切線。

〔求證〕 $OE/\!/AB$

〔證明〕 $OE$ 是切線，$OC$ 是過切點 $O$ 之弦， $\therefore$ $\angle EOC=\angle CDB$，又 $\angle CDB=\angle CAB$（同弧$BC$上之二圓周角） $\therefore$ $\angle EOC=\angle CAB$ $\therefore$ $OE/\!/AB$

## 省立嘉義家事職業學校

### I 算術

❶ $(1.4元\times8+2.5元\times3)\div(8+3)=18.7元\div11=1.7元$ 答： $1.7元$

❷ $\left(\frac{17}{19}+\frac{3}{97}\right)\div2=\left(\frac{1649}{1843}+\frac{57}{1843}\right)\div2=\frac{1706}{1843}\div2=\frac{853}{1843}$……大數

$\frac{853}{1843}-\frac{3}{97}=\frac{853}{1843}-\frac{57}{1843}=\frac{796}{1843}$……小數

答： 大數$\frac{853}{1843}$ 小數$\frac{796}{1843}$

### I 代數

❶ $125x^3-64y^3=(5x)^3-(4y)^3=(5x-4y)(25x^2+20xy+16y^2)$

答： $(5x-4y)(25x^2+20xy+16y^2)$

❷ $\begin{cases}x+y=2a\cdots\cdots①\\ x-y=2b\cdots\cdots②\end{cases}$ ①+② $2x=2a+2b$ $\therefore$ $x=a+b$

①−② $2y=2a-2b$ $\therefore$ $y=a-b$

答： $x=a+b$， $y=a-b$

❸ $\frac{5x}{x^2-1}+\frac{3x}{1-x}=\frac{5x}{(x-1)(x+1)}-\frac{3x}{x-1}=\frac{5x}{(x-1)(x+1)}-\frac{3x(x+1)}{(x-1)(x+1)}$

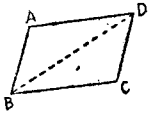
$=\frac{5x-3x^2-3x}{(x-1)(x+1)}=\frac{2x-3x^2}{(x-1)(x+1)}=\frac{x(2-3x)}{(x-1)(x+1)}$

答：$\frac{x(2-3x)}{(x-1)(x+1)}$

❶ $(3\sqrt{6}+2\sqrt{3})\times 3\sqrt{2}=9\sqrt{12}+6\sqrt{6}=9\sqrt{4\times 3}+6\sqrt{6}=$
$18\sqrt{3}+6\sqrt{6}$　　答：$18\sqrt{3}+6\sqrt{6}$

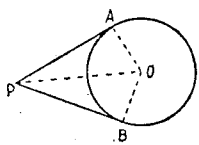
## I 幾何

❶




〔已知〕 $ABCD$ 是平行四邊形
〔求證〕 $AD=BC$, $AB=CD$, $\angle A=\angle C$, $\angle B=\angle D$
〔證明〕 作對角線 $BD$, $AD\parallel EC$
$\therefore \angle ADB=\angle CBD$ $AB\parallel CD$
$\therefore \angle ABD=\angle CDB$ $BD$ 共通，二角及公共一邊對應相等
$\therefore \triangle ABD\equiv\triangle CDB$　$\therefore AD=BC$, $AB=CD$, $\angle A=\angle C$ 又
$\angle ABD=\angle CDB$　$\angle CBD=\angle ADB$　$\therefore \angle B=\angle D$

❷




〔已知〕 從點 $P$ 至圓 $O$ 的二切線 $PA$, $PB$,
〔求證〕 $PA=PB$
〔證明〕 連結 $PO$, $OA$, $OB$ 於 $\triangle OPA$ 及 $\triangle OPB$,
$OA=OB$
$OP$ 共通
$\angle OAP=\angle OBP=\angle R$
$\therefore \triangle OAP\equiv\triangle OBP$
$\therefore PA=PB$

# 省立虎尾中學

## I 算術

(*A*) 9小時×16＝144小時……工作的總時間
6日×3＝18日……想工作的日數
144小時÷18＝8小時……每日應工作的時間
答：每日應工作8小時

(*B*) 70元×3＝210元……乙得70元時甲如得這款項，他的所有就仍能保持乙所有的3倍

$(210元-50元)\div(3-1\frac{2}{3})=160元\div 1\frac{1}{3}=160元\div\frac{4}{3}$

$=\overset{40}{\cancel{160}}元\times\frac{3}{\cancel{4}_{1}}=120元$…… 得70元後的乙的所有金

120元－70元＝50元……乙的原有金　50元×3＝150元……甲的原有金
答：甲的原有金150元，乙的原有金50元

(*C*) 4分10秒＝250秒　1000公尺÷250＝4公尺……第二船每秒的速度
4分10秒－45分5.5秒＝4.5秒……兩船所費時間的差
4公尺×4.5＝18公尺……船長一半　18公尺×2＝36公尺……船長
答：船長36公尺

## I 代數

(A) ❶ $(-a)(-a^2)\div(-a^3)=a^3\div(-a^3)=-1$ 答：$-1$

❷ $-[-\{-(-a^2)\}]-\{-(a-1)\}=a^2+a-1$ 答：$a^2+a-1$

❸ $\dfrac{-\frac{1}{3}ab^2}{\frac{3}{5}a^2b}=-\dfrac{5b}{9a}$ 答：$-\dfrac{5b}{9a}$

❹ $(a-b)+\dfrac{2ab}{a-b}=\dfrac{(a-b)^2+2ab}{a-b}=\dfrac{a^2-2ab+b^2+2ab}{a-b}=\dfrac{a^2+b^2}{a-b}$

答：$\dfrac{a^2+b^2}{a-b}$

❺ $\dfrac{1}{a+b}-\dfrac{1}{b-a}=\dfrac{b-a-(a+b)}{(a+b)(b-a)}=\dfrac{-2a}{b^2-a^2}=\dfrac{2a}{a^2-b^2}$

答：$\dfrac{2a}{a^2-b^2}$

❻ $(a+b)\times\dfrac{a^2-ab+b^2}{a(a^3+b^3)}=\dfrac{(a+b)(a^2-ab+b^2)}{a(a^3+b^3)}=\dfrac{a^3+b^3}{a(a^3+b^3)}=\dfrac{1}{a}$

答：$\dfrac{1}{a}$

(B) ❶ $15a^3x^2-5a^2xy=5a^2x(3ax-y)$ 答：$5a^2x(3ax-y)$

❷ $x^2-4x-12=(x-6)(x+2)$ 答：$(x-6)(x+2)$

❸ $x^4+x^2+1=x^4+2x^2+1-x^2=(x^2+1)^2-x^2=(x^2+1+x)(x^2+1-x)$

$=(x^2+x+1)(x^2-x+1)$ 答$(x^2+x+1)(x^2-x+1)$

❹ $4x^4-4a^2-4a-1=4x^4-(4a^2+4a+1)=(2x^2)^2-(2a+1)^2$

$=(2x^2+2a+1)(2x^2-2a-1)$ 答：$(2x^2-+2a+1)(2x^2-2a-1)$

❺ $x^4-1=(x^2-1)(x^2+1)=(x-1)(x+1)(x^2+1)$

答：$(x-1)(x+1)(x^2+1)$

(C) ❶ $2x-[3+(x-7)]=8$ $2x-3-(x-7)=8$ $2x-3-x+7=8$

$x+4=8$ $\therefore x=4$ 答：$x=4$

❷ $x^4-4x^2-45=0$ $(x^2-9)(x^2+5)=0$ $(x-3)(x+3)(x^2+5)=0$

$\therefore x=3,\ -3\ \pm\sqrt{5}\,i$ 答：$x=\pm3,\ \pm\sqrt{5}\,i$

❸ $\dfrac{x-2}{x+1}=\dfrac{x-1}{x+3}$ $(x-2)(x+3)=(x+1)(x-1)$ $x^2+x-6=x^2-1$

$x-6=-1$ $\therefore x=5$ 此值不使原方程式之分母爲 0，故可適合

答：$x=5$

❹ $x+\sqrt{x+3}=3$ $\sqrt{x+3}=3-x$ $x+3=9-6x+x^2$

$-x^2+7x-6=0$ $x^2-7x+6=0$ $(x-1)(x-6)=0$ $\therefore x=1,\ 6$

檢算的結果知只 $x=1$ 可適合 答：$x=1$

❺ $3^{x-1}=9$ $3^{x-1}=3^2$ $\therefore x-1=2$ $x=3$ 答：$x=3$

## Ⅱ 幾何

(A) ❶ 90度 ❷ 45度 ❸ $\frac{1}{2}$平角 ❹ 對角相等 ❺ $\frac{1}{2}(a+b+c)$

即三角形之周半 ⑥ 30度 ⑦ 7.5寸 ⑧ 12寸 ⑨ 相等或互成補角 ⑩ 內切圓的圓心叫做內心，是三內角的平分線的交點，外接圓的圓心叫做外心，是三邊的垂直平分線的交點

(B) ❶ $8\times 9=72$……面積　$72\div 4=18$……中線　答：中線是18

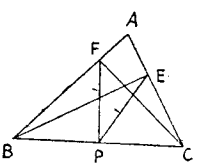
〔註〕梯形面積＝中線×高

❷ 設高爲$x$寸，則底爲$3x$寸，面積爲$3x^2$方寸，依題意得方程式

$3x^2=108$，$x^2=36$　$x=\pm 6$　$x$應該是正　$\therefore x=6$　$3x=18$

答：底18寸，高6寸

❸



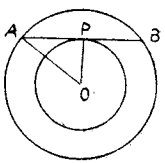

〔已知〕$\triangle ABC$中，$BE\perp AC$，$CF\perp AB$，$BP=PC$

〔求證〕$PE=PF$

〔證明〕$\triangle BEC$是直角三角形，$P$是斜邊$BC$之中點 所以 $PE=\frac{1}{2}BC$，

同樣 $PF=\frac{1}{2}BC$，　$\therefore PE=PF$

❹




〔已知〕二個同心圓中（$O$是圓心）大圓的弦$AB$切小圓於$P$.

〔求證〕原二圓所成的環等於用$AB$做直徑的圓

〔證明〕聯結 $OA$，$OP$，則 $AP=BP$

$\angle APO=\angle R$　$\therefore \overline{OA}^2-\overline{OP}^2=\overline{AP}^2$

$\pi\overline{OA}^2-\pi\overline{OP}^2=\pi\overline{AP}^2$ 所以原二圓所成的環等於用$AB$做直徑的圓。

## 省立虎尾女子中學

(一)算　術

❶ $\left.\begin{matrix}5:4:3\\1:2:3\end{matrix}\right\}=5:8:9$　　$5+8+9=22$

$1275元\div 22=62.5元$　　$62.5元\times 5=312.5元$……甲的所得

$62.5元\times 8=500元$……乙的所得　　$62.5元\times 9=562.5元$……丙的所得

答：甲312.5元，乙500元，丙562.5元

❷ 8點10分－6點＝2點10分＝130分

$130分\div 15分=8$……餘10分　　$8+1+1=10$　　$15分-10分=5分$

答：等候5分，坐第10次車

(二)代　數

❶ (Ⅰ) $16x^5-81xy^4=x(16x^4-81y^4)=x(4x^2-9y^2)(4x^2+9y^2)$

$=x(2x-3y)(2x+3y)(4x^2+9y^2)$

(Ⅱ) $x^6-1=(x^3-1)(x^3+1)=(x-1)(x^2+x+1)(x+1)(x^2-x+1)$

$=(x-1)(x+1)(x^2-x+1)(x^2+x+1)$

答：$\begin{cases}(\text{I})\ (2x-3y)(2x+3y)(4x^2+9y^2)\\(\text{II})\ (x-1)(x+1)(x^2-x+1)(x^2+x+1)\end{cases}$

❷ $\begin{cases}x^2-4xy-x+y=28\cdots①\\x-3y=9\cdots\cdots\cdots②\end{cases}$ 由②得 $x=3y+9$ ③ ③代入①

$(3y+9)^2-4y(3y+9)-(3y+9)+y-28=0$

$9y^2+54y+81-12y^2-36y-3y-9+y-28=0$ $-3y^2+16y+44=0$

$3y^2-16y-44=0$ $(3y-22)(y+2)=0$ $\therefore y=\frac{22}{3}$ 或 $-2$

代入 ③ 得 $x=3\times\frac{22}{3}+9=31$ 或 $3(-2)+9=3$

答：$\begin{cases}x=31\\y=\frac{22}{3}\end{cases}$ $\begin{cases}x=3\\y=-2\end{cases}$

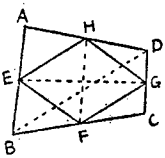
❸ 第十天的工資：$4元+0.8元\times(10-1)=4元+0.8元\times9=4元+7.2元=11.2元$

十天共得工資：$\frac{(4元+11.2元)\times10}{2}=\frac{152元}{2}=76元$

答：第十天的工資11.2元，十天共得工資76元

## (三)幾 何

❶




〔已知〕四邊形 $ABCD$ 中 $AE=EB$, $BF=FC$, $CG=GD$, $DH=HA$

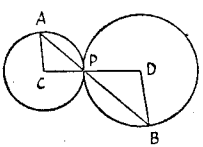
〔求證〕$EG$, $FH$ 互相平分

〔證明〕聯結 $EF$, $FG$, $GH$, $HE$, $BD$,

於 $\triangle ABD$, $AE=EB$, $AH=HD$,

$\therefore EH\parallel\frac{1}{2}BD$, 同樣可證 $FG\parallel\frac{1}{2}BD$ $\therefore EH\parallel FG$, 故四邊形 $EFGH$ 是平行四邊形，而 $EG$, $FH$ 是此四邊形之二對角線，所以必互相平分。

❷




〔已知〕兩圓 $C$, $D$ 外切於 $P$, $APB$ 爲過 $P$ 之公割線，$CA$, $DB$ 是半徑

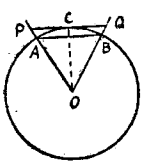
〔求證〕$PA:PB=AC:BD$

〔證明〕兩圓之圓心 $C$, $D$ 及切點 $P$ 在一直線上，作此直線 得 $\triangle ACP$, $\triangle BDP$,

$\angle APC=\angle BPD$ 又 $\angle APC=\angle PAC$, $\angle BPD=\angle PBD$

$\therefore\angle PAC=\angle PBD$ $\therefore\triangle ACP\backsim\triangle BDP$ $\therefore PA:PB=AC:BD$

❸




〔已知〕$O$ 爲圓心，$AB$ 爲圓內接正六邊形一邊，$S$ 爲面積，$PQ$ 爲圓外切正六邊形一邊，$S'$ 爲面積

〔求證〕$S=\frac{3}{4}S'$

〔證明〕$PQ$ 與圓 $O$ 相切的點爲 $C$，聯結 $OC$，則 $AB=OA$, $PQ=OP$ $\angle OCP=\angle R$, $PC=CQ$

設此圓之半徑爲 $r$, $PQ=x$, 則 $PC=\frac{x}{2}$, $OP=x$, 由畢氏定理得

$\overline{OC}^2+\overline{PC}^2=\overline{OP}^2$ 即 $r^2+\left(\frac{x}{2}\right)^2=x^2$ $x^2-\frac{x^2}{4}=r^2$ $\frac{3}{4}x^2=r^2$

同邊數之二個正多角形面積等於一邊之平方比，所以 $S:S'=\overline{AB}^2:\overline{PQ}^2$

$=r^2:x^2=\frac{3}{4}x^2:x^2=\frac{3}{4}$ $\therefore$ $S=\frac{3}{4}S'$

# 省立臺南師範學校

## I 算術

❶ $3-\cfrac{1}{2+\cfrac{2}{3+\cfrac{1}{3}}}=3-\cfrac{1}{2+\cfrac{6}{9+1}}=3-\cfrac{1}{2+\cfrac{6}{10}}=3-\cfrac{1}{2+\cfrac{3}{5}}$

$=3-\cfrac{5}{10+3}=3-\frac{5}{13}=2\frac{8}{13}$ 答：$2\frac{8}{13}$

❷

| | | |
|---|---|---|
| 3) 465 | 3255 | 1302 |
| 31) 155 | 1085 | 434 |
| 5 | 35 | 14 |

$3\times31=93$ 答：93

❸ $500元\times(1+0.24\times1\frac{6}{12})=680元$ 答：680元

❹ $\left(\frac{1}{12}+\frac{1}{8}\right)\times2=\left(\frac{2}{24}+\frac{3}{24}\right)\times2=\frac{5}{\cancel{24}\,12}\times\cancel{2}^{1}=\frac{5}{12}$ $1-\frac{5}{12}=\frac{7}{12}$

$\frac{7}{12}\div\left(\frac{1}{8}+\frac{1}{6}\right)=\frac{7}{12}\div\left(\frac{3}{24}+\frac{4}{24}\right)=\frac{7}{12}\div\frac{7}{24}=\frac{\cancel{12}^{1}}{1}\times\frac{\cancel{24}^{2}}{\cancel{7}\,1}=2$

答：2日

## I 代數

❶ $\frac{3}{x+1}-\frac{2}{x+2}=\frac{1}{x+3}$ 設$(x+1)(x+2)(x+3)\neq0$ 兩邊乘此式得

$3(x+2)(x+3)-2(x+3)(x+1)=(x+1)(x+2)$

$3(x^2+5x+6)-2(x^2+4x+3)=x^2+3x+2$

$3x^2+15x+18-2x^2-8x-6=x^2+3x+2$

$x^2+7x+12=x^2+3x+2$ $4x=-10$ $\therefore$ $x=-2.5$

此值可適合 $(x+1)(x+2)(x+3)\neq0$ 答：$x=-2.5$

❷ $\begin{cases}x+y=8 & ①\\ x^2+y^2=50 & ②\end{cases}$ 由②得 $(x+y)^2-2xy=50$ ③

①代入③ $64-2xy=50$ $-2xy=-14$ $xy=7$ ④

解①④得 $x=1$, $y=7$ 或 $x=7$, $y=1$

答：$\begin{cases}x=1\\y=7\end{cases}$ $\begin{cases}x=7\\y=1\end{cases}$

❸ $\frac{1}{x-a}-\frac{1}{x+a}-\frac{2a}{x^2+a^2}-\frac{4a^3}{x^4+a^4}=\frac{(x+a)-(x-a)}{(x-a)(x+a)}-\frac{2a}{x^2+a^2}-\frac{4a^3}{x^4+a^4}$

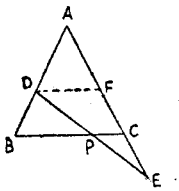
$=\frac{2a}{x^2-a^2}-\frac{2a}{x^2+a_2}-\frac{4a^3}{x^4+a^4}=\frac{2a(x^2+a_2)-2a(x^2-a^2)}{(x^2-a^2)(x^2+a^2)}-\frac{4a^3}{x^4+a^4}$

$=\frac{4a^3}{x^4-a^4}-\frac{4a^3}{x^4+a^4}=\frac{4a^3(x^4+a^4)-4a^3(x^4-a^4)}{(x^4-a^4)(x^4+a^4)}=\frac{8a^7}{x^8-a^8}$

答：$\frac{8a^7}{x^8-a^8}$

## Ⅱ 幾何

❶




〔已知〕 $\triangle ABC$ 中 $AB=AC$, $BD=CE$

〔求證〕 $DP=PE$

〔證明〕 過 $D$ 作 $BC$ 之平行線 $DF$, 交 $AC$ 於 $F$, 則 $\angle ADF=\angle B$, $\angle AFD=\angle C$, 而且 $\angle B=\angle C$ $\therefore ADF=\angle AFD$ $\therefore AD=AF$

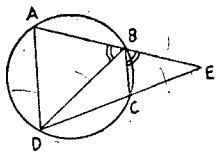
又 $AB=AC$ $\therefore$ $AB-AD=AC-AF$

即 $BD=FC$, 已知 $BD=CE$ $\therefore$ $FC=CE$

於 $\triangle DFE$, $FC=CE$ 而且 $DF/\!/PC$

$\therefore$ $DP=PE$

❷




〔已知〕 $ABCD$ 爲圓內接四邊形

$\angle DBA=\angle CBE$

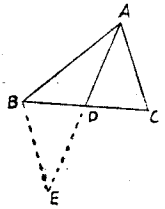
〔求證〕 $AD\cdot BE=CE\cdot BD$

〔證明〕 於 $\triangle ABD$, $\triangle CBE$,

$\left.\begin{matrix}\angle DBA=\angle CBE\\ \angle BAD=\angle BCE\end{matrix}\right\}\therefore \triangle ABD\backsim\triangle CBE$

$\therefore$ $AD:CE=BD:BE$ $\therefore$ $AD\cdot BE=CE\cdot BD$

❸




〔已知〕 $\triangle ABC$中, $AB>AC$ $BD=DC$

〔求證〕 $\angle BAD<\angle CAD$

〔證明〕 延長 $AD$ 到 $E$, 使 $DE=AD$, 聯結 $BE$, 則

$\left.\begin{matrix}AD=DE\\ DC=BD\\ \angle ADC=\angle BDE\end{matrix}\right\}\therefore \triangle ADC\equiv\triangle BDE$

$\therefore AC=BE$,

$\angle CAD=\angle BED$ 已知 $AB>AC$ $\therefore AC>BE$

於 $\triangle ABE$, $AE>BE$ $\therefore <BED>\angle BAD$

$\therefore$ $CAD>\angle BAD$

# 省立臺南第一中學

一、是非題

❶是 ❷是 ❸是 ❹非 ❺非 ❻是 ❼非 ❽是 ❾非 ❿非

二、填充題

❶ $a+b+c$ ❷ 27 ❸ 垂直 ❹ 150 ❺ $-\sqrt{3}$, 9 ❻ 平分線 ❼ 直

線，拋物線 ㊄ 直徑，圓心 ㊀ 4 ㊁ 28, 30

三、❶ $\sqrt{2}=\sqrt[6]{2^3}=\sqrt[6]{8}$ $\sqrt[3]{3}=\sqrt[6]{3^2}=\sqrt[6]{9}$

$\sqrt[6]{9}>\sqrt[6]{8}>\sqrt[6]{7}$ $\therefore \sqrt[3]{3}>\sqrt{2}>\sqrt[6]{7}$

答：$\sqrt[3]{3}>\sqrt{2}>\sqrt[6]{7}$

❷ $x\frac{1}{2a-3b}x\frac{1}{2a+3b}x\frac{4a}{4a^2-9b^2}=x\frac{1}{2a-3b}+\frac{1}{2a+3b}+\frac{4a}{4a^2-9b^2}$

$=x\frac{2a+3b+2a-3b+4a}{4a^2-9b^2}=x\frac{8a}{4a^2-9b^2}$ 答：$x\frac{8a}{4a^2-9b^2}$

❸ $1-\frac{4}{5+\frac{3}{4-\frac{1}{3}}}=1-\frac{4}{5+\frac{9}{12-1}}=1-\frac{4}{5+\frac{9}{11}}=1-\frac{44}{55+9}$

$=1-\frac{44}{64}=1-\frac{11}{16}=\frac{5}{11}$ 答：$\frac{5}{11}$

❹ 設其邊之長爲 $x$ 公寸，$y$ 公寸，依題意得下列方程式

$\begin{cases} x^2+y^2=20\cdots\cdots① \\ (x+4)(x+1)+(y+4)(y+1)=58\cdots\cdots② \end{cases}$ 化簡②得 $x^2+y^2+5x+5y=50\cdots\cdots③$

①代入③ $20+5x+5y=50$ 化簡之得 $x+y=6\cdots\cdots④$ 把①變形爲 $(x+y)^2-2xy=20$ 代入④方此式 $36-2xy=20$ 即 $xy=8\cdots\cdots⑤$ 解④、⑤得 $x=2$, $y=4$ 或 $x=4$, $y=2$

答：2公寸，4公寸

❺

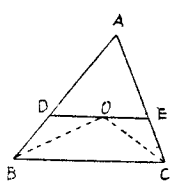

〔已知〕 $\triangle ABC\backsim\triangle A'B'C'$ $AD$, $A'D'$ 爲對應高

〔求證〕 $\triangle ABD\backsim\triangle A'B'D'$ $\triangle ACD\backsim\triangle A'C'D'$

〔證明〕 於 $\triangle ABD$, $\triangle A'B'D'$, $\angle B=\angle B'$ $\angle ADB=\angle A'D'B'$

$\therefore$ $\triangle ABD\backsim\triangle A'B'D'$ 同樣可證 $\triangle ACD\backsim\triangle A'C'D'$

❻




〔解析〕 設適合條件之線段 $DE$ 已經作成，則 $DE/\!/BC$ $DE=BD+CE$, 在 $DE$ 上取一點 O, 使 $DO=BD$, 則 $OE=CE$ 連結 $BO$, $CO$, 則 $\angle CBO=\angle BOD=\angle OBD$ $\angle BCO=\angle COE=\angle OCE$, 因此，O 是 $\triangle ABC$ 之內心。

〔作圖〕 作 $\angle B$ 之平分線 $BO$, 及 $\angle C$ 之平分線 $CO$, 使其相交於 O, 過 O, 作 $BC$ 之平行線 $DE$, 與 $AB$ 交於 $D$, 與 $AC$ 交於 $E$。

〔證明〕 $\angle DOB=\angle CBO=\angle OBD$, $\therefore$ $DO\parallel BD$

$\angle EOC=\angle BCO=\angle OCE$ ∴ $OE=CE$

因此， $DO+OE=BD+CE$ 即 $DE=BD+CE$

〔討論〕 無論 $\triangle ABC$ 之形狀如何，恒有一解。

❼

| | | |
|---|---|---|
| 143 | 1 | 221 |
| 78 | 1 | 143 |
| 65 | 1 | 78 |
| 65 | | 65 |
| 0 | 5 | 13 |

求221公分及143公分的 $G,C,M$, 得13公分，這就是所求正方形的邊長　221公分÷13公分＝17

43公分÷13公分＝11　$17\times11=187$

答：187個

❽ 設其對應斜邊之高爲 $x$，依題意得方程式。

$\frac{1}{2}\times3\times4=\frac{1}{2}\times5x$　解之得 $x=2.4$　　答：2.4

## 省立臺南第二中學

**I** 填空白

❶ 2240, 2000　❷ 365,2422日，0.9638 日　❸ 4 分，4 秒　❹ 前項，後項，比值，分子，分母，分數值，被除數，除數，商　❺ 10, 1, 0.01　❻ 打九五折，5%扣　❼ 1　❽ $a$　❾ $\frac{x}{3}$　❿ $a+\sqrt{b}$　⓫ $\sqrt{3}+\sqrt{2}$

⓬ $\frac{\sqrt{a-b}}{a-b}$　⓭ $-i$, $-1$　⓮ $-\frac{n}{m}$, $\frac{v}{m}$　⓯ $(2x^2-3)(x^2+1)$

⓰ $(a^2+ab+b^2)(a^2-ab+b^2)$　⓱ $(x^a-1)(x^a-1)$　⓲ $b^2-c$　⓳ 125, 25, 5

⓴ 互相垂直的兩直線之交點。　㉑ 比直角大而比二直角小的角，比直角小的角。　㉒ 此二直線之距離。　㉓ 各邊都相等的四邊形。　㉔ $(2n-4)$ 直角

㉕ 邊心距與周界乘積的一半。　㉖ 圓周×$\frac{\text{圓心角}}{360}$　㉗ 三個高之交點

㉘ 2條，1條

**I** 算術

❶ $(1\frac{1}{5}+3\frac{1}{3}\times\frac{3}{8})\div\left\{(4-1\frac{1}{2})\times\frac{1}{2}+2\frac{4}{5}\right\}$

$=(1\frac{1}{5}+\frac{10}{3}\times\frac{3}{8})\div\left\{2\frac{1}{2}\times\frac{1}{2}+2\frac{4}{5}\right\}$

$=(1\frac{1}{5}+1\frac{1}{4})\div\left\{\frac{5}{2}\times\frac{1}{2}+2\frac{4}{5}\right\}$

$=(1\frac{4}{20}+1\frac{5}{20})\div(1\frac{5}{20}+2\frac{16}{20})=2\frac{9}{20}\div3\frac{21}{20}=\frac{49}{20}\div\frac{81}{20}$

$=\frac{49}{20}\times\frac{20}{81}=\frac{49}{81}$　　答：$\frac{49}{81}$

❷ $\dfrac{1-\dfrac{1}{2-\dfrac{1}{3}}}{1+\dfrac{1}{2+\dfrac{1}{3}}}=\dfrac{1-\dfrac{3}{6-1}}{1+\dfrac{3}{6+1}}=\dfrac{1-\dfrac{3}{5}}{1+\dfrac{3}{7}}=\dfrac{\dfrac{2}{5}}{\dfrac{10}{7}}=\dfrac{\dfrac{1}{2}}{5}\times\dfrac{7}{10}=\dfrac{7}{25}$

答：$\frac{7}{25}$

❸ 設丙的身長爲1，則乙的身長爲 $1-0.05=0.95$，甲的身長爲 $0.95\times(1+0.05)=0.9975$ $0.9975<1$ 所以丙比甲高　答：丙比甲高

❹ $72\times4=288$……兩數和的4倍　$288+6=294$……一數的4+3=7(倍)

$294\div7=42$……一數 $72-42=30$……另一數　答：42, 30

## Ⅰ 代數

❶ $\dfrac{1}{x^2-\dfrac{x^3+1}{x+\dfrac{1}{x-1}}}=\dfrac{1}{x^2-\dfrac{(x^3+1)(x-1)}{x(x-1)+1}}=\dfrac{1}{x^2-\dfrac{(x+1)(x^2-x+1)(x-1)}{x^2-x+1}}$

$=\dfrac{1}{x^2-(x+1)(x-1)}=\dfrac{1}{x^2-(x^2-1)}=\dfrac{1}{x^2-x^2+1}=1$　答：1

❷ $(a-bi)^2\pm(a+bi)^2=a^2-2abi+b^2i^2\pm(a^2+2abi+b^2i^2)$

$=(a^2-2abi-b^2)\pm(a^2+2abi-b^2)=2(a^2-b^2)$ 或 $-4abi$

答：$2(a^2-b^2)$ 或 $-4abi$

❸ $\dfrac{1+i}{1-i}\pm\dfrac{1-i}{1+i}=\dfrac{(1+i)^2\pm(1-i)^2}{(1-i)(1+i)}=\dfrac{1+2i+i^2\pm(1-2i+i^2)}{1-i^2}$

$=\dfrac{1+2i-1\pm(1-2i-1)}{1+1}=\dfrac{2i\mp(-2i)}{2}=0$, 或 $2i$　答：0或$2i$

❹ $\begin{cases}x^2+y^2=97\cdots\cdots①\\ xy=36\cdots\cdots②\end{cases}$　①+②×2 $(x+y)^2=169$

$\therefore x+y=13$③ 或 $x+y=-13$④

解②、③得 $x=4$, $y=9$ 及 $x=9$, $y=4$, 解②、④得 $x=-4$, $y=-9$ 及 $x=-9$, $y=-4$

答：$\begin{cases}x=4\\y=9\end{cases}$ $\begin{cases}x=9\\y=4\end{cases}$ $\begin{cases}x=-4\\y=-9\end{cases}$ $\begin{cases}x=-9\\y=-4\end{cases}$

❺ $5\sqrt{1-x^2}=7-5x$ 兩邊平方 $25(1-x^2)=49-70x+25x^2$　$-50x^2+70x-24=0$ $25x^2-35x+12=0$ $(5x-3)(5x-4)=0$ $\therefore x=\dfrac{3}{5},\ \dfrac{4}{5}$ 檢算結果知兩根都可適合原方程式　答：$x=\dfrac{3}{5},\ \dfrac{4}{5}$

❻ ① $a^2-a-c^2+c=(a^2-c^2)-(a-c)=(a-c)(a+c)-(a-c)$

$=(a-c)(a+c-1)$

② $x^4-x^3+2x^2-x+1=(x^4+2x^2+1)-(x^3+x)=(x^2+1)^2-x(x^2+1)$

$=(x^2+1)(x^2+1-x)=(x^2+1)(x^2-x+1)$

答：① $(a-c)(a+c-1)$ ② $(x^2+1)(x^2-x+1)$

❼ $3kx^2-4x+5=0$ 之兩根相等，故其判別式等於0，

即 $(-2)^2-5\times3k=0$ $4-15k=0$ $\therefore k=\dfrac{4}{15}$　答：$k=\dfrac{4}{15}$

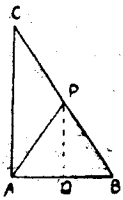
❽ $ax^2+bx+c=0$ 之二根是 $\alpha$, $\beta$, $\alpha\beta=\dfrac{c}{a}$……① 以$\alpha\beta$, $\dfrac{1}{\alpha\beta}$爲二根之方程式爲 $(x-\alpha\beta)(x-\dfrac{1}{\alpha\beta})=0$ 牠①代入此式得 $(x-\dfrac{c}{a})(x-\dfrac{a}{c})=0$

即 $x^2-(\dfrac{c}{a}+\dfrac{a}{c})x+1=0$ $acx^2-(a^2+c^2)x+ac=0$

答：$acx^2-(a^2+c^2)x+ac=0$

## N 幾何

❶

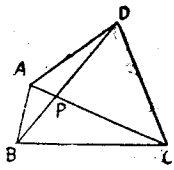



〔已知〕 $\angle BAC=\angle R$, $BP=CP$

〔求證〕 $AP=BP=CP$

〔證明〕 作$PQ\perp AB$, 則 $PQ/\!/CA$, 於$\triangle ABC$, $CP=BP$, $PQ=CA$ ∴$AQ=BQ$ 比較$\triangle APQ$, $\triangle BPQ$, $AQ=BQ$, $PQ$ 爲共通, $\angle AQP=\angle BQP$ ∴ $\triangle APQ\equiv\triangle BPQ$ ∴ $AP=BP$ 已知 $BP=CP$ ∴ $AP=BP=CP$

❷




〔已知〕 $ABCD$爲任意四邊形, $AC$, $BD$爲其二對角線

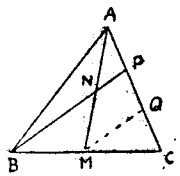
〔求證〕 $AC+BD>\frac{1}{2}(AB+BC+CD+DA)$

〔證明〕 $AC$, $BD$ 之交點爲$P$, 於 $\triangle ABP$, $AP+BP>AB$① 於 $\triangle BCP$, $BP+CP>BC$② 於$\triangle CDP$, $CP+DP>CD$③, 於$\triangle DAP$, $DP+AP>DA$④

①+②+③+④ $2(AC+BD)>AB+BC+CD+DA$

$\therefore AC+BD>\frac{1}{2}(AB+BC+CD+DA)$

❸

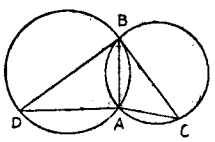



〔已知〕 於$\triangle ABC$, $BM=MC$, $AN=NM$, $BN$之延長線與$AC$之交點爲$P$

〔求證〕 $AP=\frac{1}{3}AC$

〔證明〕 過$M$,作直線$MQ$, 平行於$BP$, 交$AC$於$Q$, 於$\triangle AMQ$, $AN=NM$, $NP/\!/MQ$ ∴ $AP=PQ$, 於 $\triangle BCP$, $BM=MC$, $BP/\!/MQ$ ∴$PQ=QC$ 因此, $AP=PQ=QC$ 故$AP=\frac{1}{3}AC$

❹



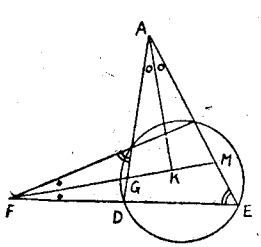

〔已知〕 兩圓相交於 $A$, $B$, 作 $BC$, $BD$ 兩弦各切於他圓,

〔求證〕 $\overline{AB}^2=AC\cdot AD$

〔證明〕 於$\triangle ABD$, $\triangle ABC$, $\angle ADB=\angle ABC$ $\angle ABD=\angle ACB$ ∴ $\triangle ABD\backsim\triangle ABC$

∴ $AD:AB=AB:AC$ ∴ $\overline{AB}^2=AC\cdot AD$

❺



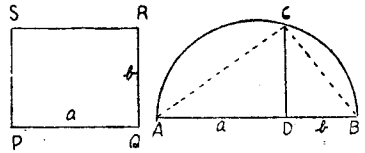

〔已知〕 $BCED$爲圓內接四邊形, $\angle CAK=\angle BAK$, $\angle BFK=\angle DFK$

〔求證〕 $AK\perp FK$

〔證明〕 於$\triangle FBG$, $FEM$, $\angle BFG=\angle EFM$ $\angle FBG=\angle FEM$ ∴$\angle FGB=\angle FME$, ∴$\angle AGM=\angle AMG$ 故知$\triangle AGM$ 爲等腰三角形, 而$AK$是其頂角 $GAM$ 之分角線

，故必垂直於底邊$GM$ 即 $AK \perp FK$

❻




〔題意〕 求作一正方形，使其面積等於已知矩形$PQRS$。

〔作圖〕 設$SR=a$, $PS=b$, 引一直線 $ACB$, 在此直線上取三點 $A$, $C$, $B$, 使 $AC=a$, $CB=b$, 以$AB$爲直徑畫半圓，過$C$,作$AB$之垂線 $CP$, 交半圓於$D$, 以$CD$ 爲一邊作正方形，便合所求。

〔證明〕 連結$AD$, $BD$, 則 $\angle ADB=\angle R$, 而 $DC \perp AB$

$\therefore\ \overline{CD}^2=AC\cdot CB=ab$ 故以$CD$ 爲一邊所作之正方形其面積等於已知矩形$PQRS$。

〔討論〕 恒有一解。

## 省立臺南女子中學

一、是非題

❶ − ❷ + ❸ + ❹ − 〔註〕此點是三角形之外心。 ❺ − ❻ +

❼ − ❽ + 〔註〕但是$x$不能等於0 ❾ − ❿ − 〔註〕$\sqrt[m]{a^n}=a^{\frac{n}{m}}$

二、問答題：

❶ 弓形爲包圍於一弦與一弧間之部分，扇形爲包圍於二半徑與一弧之間者。

❷ 各角都相等，各邊也都相等的多角形叫做正多角形。

❸ 各邊都相等的四邊形叫做菱形，各角都是直角的四邊形叫做矩形，各邊都相等，而且各角都是直角的四邊形叫做正方形。

❹ 三角形之三邊之中垂線的交點叫做外心，三內角之分角線的交點叫做內心，三中線之交點叫做重心，三個高之交點叫做垂心。

❺ 無論用什麼數代替其文字，等號兩邊常常相等的，叫做恒等式。
只有用特別幾個數代替其文字，始相等的，叫做方程式。

❻ 例如方程式 $x+y+z=3$, 一方程式中有幾個元，任意對調其中二個，都不改變其內容時，這方程式就叫做這幾個元的對稱方程式。

❼ 一個整式如等於幾個整式的乘積時，則後面的幾個整式都叫做前面的那個整式的因式，一個因式如不能再寫成幾個整式的乘積時就叫質因式。

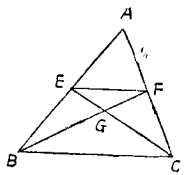
❽ 單項式中除去主要文字之外，其餘的文字或數字都叫這元的係數，例如$2x$中的2是 $x$ 的係數。

❾ 一個有號數，除去其性質符號而不計，只論它所含數值的大小，這樣得來的數，叫做該數絕對值。

❿ 例如 $1-2x+3x^2+5x^3$, 一主要文字 $x$ 之多項，式各項冪之次數自左而右，逐項增加的叫做升冪式，又如 $5x^3+3x^2-2x+1$, 各項的次數，自左而右，逐次減少的，叫做降冪式。

三、演算題

❶




〔題意〕 $G$為$\triangle ABC$之重心，$E$, $F$為$AB$, $AC$之中點，求$\triangle ABC : \triangle EFG$

〔解〕 $G$為$\triangle ABC$之重心 $\therefore \triangle GBC = \frac{1}{3}\triangle ABC$ ①

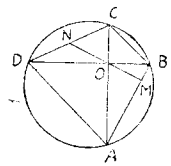
$\angle GFE = \angle GBC$, $\angle GEF = \angle GCB$

$\therefore \triangle EFG \backsim \triangle GBC$ $\therefore \triangle EFG : \triangle GBC = \overline{GF}^2 : \overline{BG}^2 = 1 : 4$

即 $\triangle GBC = 4\triangle BFG$ ……② 比較①，②得 $\frac{1}{3}\triangle ABC = 4\triangle EFG$

$\therefore \triangle ABC : \triangle EFG = 12$ 答：12

❷




〔已知〕 $ABCD$為圓內接四邊形 $AC \perp BD$, $OM \perp AB$

〔求證〕 $CN = ND$

〔證明〕 $\angle DON = \angle BOM = \angle R - \angle AOM = \angle CAB = \angle CDO = \angle ODN$ 於$\triangle NDO$, $\angle DON = \angle ODN$ $\therefore ND = ON$ 同樣可證 $CN = ON$ $\therefore CN = ND$

❸ $(x-2)(x-5)(x-7) = 8 \cdot 5 \cdot 3$ $x^3 - 14x^2 + 59x - 70 = 120$

$x^3 - 14x^2 + 59x - 190 = 0$ $x^3 - 10x^2 - 4x^2 + 59x - 190 = 0$

$x^2(x-10) - (4x^2 - 59x + 190) = 0$ $x^2(x-10) - (4x-19)(x-10) = 0$

$(x-10)(x^2 - 4x + 19) = 0$ $\therefore x - 10 = 0$ 或 $x^2 - 4x + 19 = 0$ 即 $x = 10$ 或 $x = 2 \pm \sqrt{15}\, i$

答：$x = 10$, $2 \pm \sqrt{15}\, i$

❹ $x^3 + x^2 - 17x + 15 = x^3 - x^2 + 2x^2 - 17x + 15 = x^2(x-1) + (x-1)(2x-15)$

$= (x-1)(x^2 + 2x - 15) = (x-1)(x-3)(x+5)$

答：$(x-1)(x-3)(x+5)$

❺ 假定此數爲 $a-d$, $a$, $a+d$, 依題意得方程式

$$\begin{cases} a-d+a+a+d = 18 \cdots\cdots ① \\ (a-d)^2 + a^2 + (a+d)^2 = 126 \cdots\cdots ③ \end{cases}$$

化簡①得 $a = 6$ ……④

化簡②得 $3a^2 + 2d^2 = 126$ ……④

④代入④ $108 + 2d^2 = 126$ $2d^2 = 18$ $d^2 = 9$ $\therefore d = \pm 3$ $d = 3$ 時

$a - d = 6 - 3 = 3$ $a + d = 6 + 3 = 9$ $d = -3$時，$a - d = 6 + 3 = 9$ $a + d = 6 - 3 = 3$ 因此，所求之三數爲 3, 6, 9 或 9, 6, 3 答：3, 6, 9 或 9, 6, 3

❻ $10 \times \frac{1}{3} = \frac{10}{3} = 3\frac{1}{3}$ $10 - 3\frac{1}{3} = 6\frac{2}{3}$ $\frac{9}{11} - \frac{2}{3}$

$= \frac{27}{33} - \frac{22}{33} = \frac{5}{33}$ $3\frac{1}{3} \div \frac{5}{33} = \frac{\overset{2}{\cancel{10}}}{\underset{1}{\cancel{3}}} \times \frac{\overset{11}{\cancel{33}}}{\underset{1}{\cancel{5}}} = 22$

$22 - 10 = 12$……大數 $\overset{4}{\cancel{12}} \times \frac{2}{\underset{1}{\cancel{3}}} = 8$……小數 答：大數12, 小數8

# 省立臺南高級工業職業學校

## I 基本常識測驗

❶ 分子，也大，分母　❷ 365.2422日，0.9688日　❸ 4分，4秒
❹ 除1和本數外，沒有其他的約數的。　❺ $x^{7+c}$　❻ $3a^2$　❼ $-i$, $-i$
❽ $\pm 9ab^2$　❾ 999100269973〔註〕$99973=(10000-3)^3=100003-3\times100002\times3+3\times10000\times3^2-3^3=1000000000000-900000000+270000-27=999100269973$　❿ $1-10y+40y^2-80y^3+80y^4-32y^5$　⓫ 10
⓬ $4abi$〔註〕原式$=a^2+2abi+b^2i^2-a^2+2abi-b^2i^2=4abi$　⓭ $\frac{6+17i}{25}$
〔註〕$\frac{3+2i}{4-3i}=\frac{(3+2i)(4+3i)}{(4-3i)(4+3i)}=\frac{12+9i+8i-6}{16+9}=\frac{6+17i}{25}$　⓮ 共軛角
⓯ 假設，終結　⓰ 外心　⓱ 高，內心　⓲ 此二平行線之距離
⓳ 綜合，歸納　⓴ 等差中項$\frac{a+b}{2}$，調和中項$\frac{2ab}{a+b}$

## I 算術

❶ $\left.\begin{matrix}5:4:3\\1:2:3\end{matrix}\right\}=5:8:9$　$5+8+9=22$　$1375元\div22=62.5元$
$62.5元\times5=312.5元$……甲的所得　$62.5元\times8=500元$……乙的所得
$62.5元\times9=562.5元$……丙的所得
答：甲312.5元，乙500元，丙562.5元

❷ $6+5+3+2=16$　$816人\div16=51人$　$51人\times6=306人$……機械
$51人\times5=255人$……電機　$51人\times3=153人$……土木
$51人\times2=102人$……化工
答：機械306人，電機255人，土木153人，化工102人

## I 代數

❶ (a) $x^2-x-y^2+y=(x-y)(x+y)-(x-y)=(x-y)(x+y-1)$
(b) $a^4-a^3+2a^2-a+1=a^4+2a^2+1-(a^3+a)=(a^2+1)^2-a(a^2+1)$
$=(a^2+1)(a^2+1-a)=(a^2+1)(a^2-a+1)$
答：(a) $(x-y)(x+y-1)$　(b) $(a^2+1)(a^2-a+1)$

❷ (a) $\begin{cases}\frac{1}{x}-\frac{2}{y}=7\cdots\cdots①\\\frac{3}{x}+\frac{4}{y}=1\cdots\cdots②\end{cases}$　①×2+②　$\frac{5}{x}=15$　$\therefore x=\frac{1}{3}$　代入①
$3-\frac{2}{y}=7$　$-\frac{2}{y}=4$　$\therefore y=-\frac{1}{2}$

(b) $\begin{cases}x^3-y^3=218\cdots\cdots①\\x-y=2\cdots\cdots②\end{cases}$　由①　$(x-y)(x^2+xy+y^2)=218$
代入②於此式　$2(x^2+xy+y^2)=218$
$x^2+xy+y^2=109$ ③　由②得　$x=y+2$ ④，④代入③　$(y+2)^2+y(y+2)+y^2-109=0$
$y^2+4y+4+y^2+2y+y^2-109=0$
$3y^2+6y-105=0$　$y^2+2y-35=0$　$(y-5)(y+7)=0$　$\therefore y=5$
或 $-7$　代入④　得　$x=7$　或　$-5$

答： (a) $x=\frac{1}{3}, y=-\frac{1}{2}$ (b) $\begin{cases}x=7\\y=5\end{cases}$ $\begin{cases}x=-5\\y=-7\end{cases}$

❸ (a) $2\sqrt{x}-\sqrt{4x-11}=1$ $2\sqrt{x}=\sqrt{4x-11}+1$ 兩邊平方

$4x=4x-11+2\sqrt{4x-11}+1$ $-2\sqrt{4x-11}=-10$ $\sqrt{4x-11}=5$

兩邊再平方 $4x-11=25$ $4x=36$ $\therefore x=9$ 把此值代入原方程式

$2\sqrt{x}-\sqrt{4x-11}=2\sqrt{9}-\sqrt{36-11}=6-5=1$ 知可適合

答： $x=9$

(b) $2x^4-3x^3-4x^2-3x+2=0$ $2x^2-3x-4-\frac{3}{x}+\frac{2}{x^2}=0$

$2(x^2+\frac{1}{x^2})-3(x+\frac{1}{x})-4=0$ 設$x+\frac{1}{x}=y$ 兩邊平方

$x^2+2+\frac{1}{x^2}=y^2$ 即 $x^2+\frac{1}{x^2}=y^2-2$ 代入上原方程式

$2(y^2-2)-3y-4=0$ $2y^2-4-3y-4=0$ $2y^2-3y-8=0$

$y=\frac{3\pm\sqrt{9+64}}{4}=\frac{3\pm\sqrt{73}}{4}$ $\therefore x+\frac{1}{x}=\frac{3\pm\sqrt{73}}{4}$

$4x^2-(3\pm\sqrt{73})x+4=0$ $\therefore x=\frac{3\pm\sqrt{73}\pm\sqrt{(3\pm\sqrt{73})^2-64}}{8}$

$=\frac{3+\sqrt{73}\pm\sqrt{9+6\sqrt{73}+73-64}}{8}=\frac{3\pm\sqrt{73}\pm\sqrt{18\pm6\sqrt{73}}}{8}$

答： $x=\frac{3+\sqrt{73}+\sqrt{18\pm6\sqrt{73}}}{8}, \frac{3\pm\sqrt{73}-\sqrt{18\pm6\sqrt{73}}}{8}$

（複號同順）

❹ (a) $3kx^2-6x+1=0$ 之兩根相等， $\therefore (-3)^2-3k=0$ $9-3k=0$

$-3k=-9$ $\therefore k=3$ 答： $k=3$

(b) 16.1，48.3，80.5……成 $A$, $P$, 其首項爲 16.1，公差爲 32.2，所求的，是第15項，由是 第15秒落下 $16.1+32.2\times(15-1)=16.1+32.2\times14=16.1+450.8=466.9$(呎) 答： 466.9呎

## Ⅳ 幾何

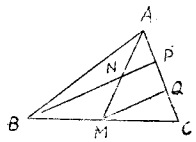
❶


〔已知〕 兩圓相交於 $A$, $B$, 二點，$CAD$ 是過 $A$ 點之任意割線。

〔求證〕 $\angle CBD$ 是一定。

〔證明〕 $\overset{\frown}{AB}$ 爲定弧，所以 $\angle C$ 爲一定，(2) 同樣 $\angle D$ 亦爲一定(β)因此，$\angle CBD=180°-(\angle C+\angle D)=180°-(\alpha+\beta)$ 故 $\angle CBD$ 亦爲一定。

❷



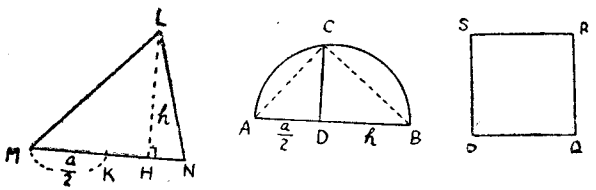

〔已知〕 於 $\triangle ABC$, $BM=MC$, $AN=NM$

〔求證〕 $AP=\frac{1}{3}AC$

〔證明〕 過 $M$, 作 $MQ$, 平行於 $BP$, 交 $AC$ 於 $Q$, 於 $\triangle AMQ$, $AN=NM$, $NP/\!/MQ$

$\therefore AP=PQ$, 又於 $\triangle BCP$, $BM=MC$, $BP/\!/MQ$, $\therefore PQ=QC$, 因此, $AP=PQ=QC$ $\therefore AP=\frac{1}{3}AC$

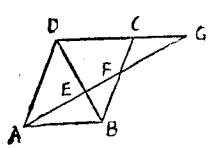
❸




〔作圖〕 已知三角形 $LMN$ 之高爲 $h$, 底之一半爲 $\frac{a}{2}$, 畫線段 $ADB$, 使 $AD=\frac{a}{2}$, $DB=h$, 用 $ADB$ 做直徑畫半圓, 過 $D$, 作 $AB$ 之垂線 $DC$, 使其與半圓周交於 $C$, 作一線段 $PQ$ 等於 $CD$, 用 $PQ$ 做一邊, 作正方形 $PQRS$, 便合所求。

〔證明〕 聯結 $CA, CB$ 則 $\angle ACB=\angle R$, 又 $CD\perp AB$, $\therefore \overline{CD}^2=AD\cdot DB=\frac{ah}{2}$ 又 $PQ=CD$ $\therefore$ 正方形 $PQRS=\overline{PQ}^2=\overline{CD}^2=\frac{ah}{2}=\triangle LMN$

❶




〔已知〕 $ABCD$ 是平行四邊形, $AEFG$ 是過 $A$ 之直線。

〔求證〕 $\frac{EF}{EA}=\frac{EA}{EG}$

〔證明〕 $AD/\!/BF$, $\therefore \frac{EF}{EA}=\frac{EB}{ED}$ 又 $AB/\!/DG$, $\therefore \frac{EB}{ED}=\frac{EA}{EG}$ $\therefore \frac{EF}{EA}=\frac{EA}{EG}$

## 省立工學院附設工業職業學校

(甲)是非題

❶非 ❷非 ❸是 ❹是 ❺非 ❻是 ❼非 ❽是 ❾非 ❿是

(乙)填充題

❶ 三 ❷ 本金 ❸ 除數 ❹ $(2x-1)(4x^2+2x+1)$ ❺ $1, -1, i, -i$

❻ 1 ❼ 180 ❽ $\sqrt{a^2+b^2}$ ❾ 平分，垂直 ❿ $\frac{底\times高}{2}$

(丙)演算題

❶ 設大數爲 $x$, 小數爲 $y$, 則 $x+y=3(x-y)$, $x+y=3x-3y$ $4y=2x$ $2y=x$ 故 $x$, $y$ 之最小的正整數值 是 $x=2$, $y=1$

答： 該兩數最小的正整數數字是 2，1

❷ $\sqrt{2x-5}-\sqrt{x+2}=0$ $\sqrt{2x-5}=\sqrt{x+2}$ 兩邊平方 $2x-5=x+2$

$\therefore x=7$ 驗算 $\sqrt{2x-5}-\sqrt{x+2}=\sqrt{2\times7-5}-\sqrt{7+2}=\sqrt{9}$

$-\sqrt{9}=0$ 答： $x=7$

❸ 等邊三角形之一邊爲 $2x$ 時，其高爲 $2x\times\frac{\sqrt{3}}{2}=\sqrt{3}x$ 因此，此三角形之面積爲 $\frac{2x\times\sqrt{3}x}{2}=\sqrt{3}x^2$

答： 此三角形之面積爲 $\sqrt{3}x^2$

## 臺南市私立長榮中學

Ⅰ 是非

❶ − ❷ + ❸ + ❹ − ❺ +

Ⅱ 填充

❶ $\frac{8x}{25y^4}$ 〔註〕 $\frac{16x^2}{5y^3}\div10xy=\frac{16x^2}{5y^3}\times\frac{1}{10xy}=\frac{8x}{25y^4}$

❷ $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$, $b^2-4ac$ ❸ 2, $2^{m-2}$ ❹ 三中線的交點 ❺ 直角

Ⅲ 改錯

❶ 0 ❷ 第$n$項$=2n-1$ ❸ 一內角是144度 ❹ 0 ❺ 等於對應邊的平方之比。

Ⅳ 設此三數爲 $x-1$, $x$, $x+1$, 依題意得方程式， $(x-1)(x+1)+x=29$,

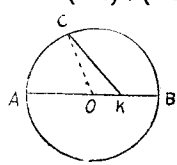
解之 $x^2-1+x-29=0$ $x^2+x-30=0$ $(x+6)(x-5)=0$ $\therefore x=-6$ 或 5 故此三數爲 $-7$, $-6$, $-5$, 或 4, 5, 6 答：$-7$, $-6$, $-5$ 或 4, 5, 6

Ⅴ $\begin{cases}x+2y-3z=0 & 1,\ 2,-3,\ 1,\\ & \times\ \ \times\ \ \times\\ 5x-6y+72=0 & 5,-6,\ 7,\ 5\end{cases}$ (利用十字法)

$x:y:z=[2\times7-(-3)(-6)]:[(-3)\times5-1\times7]:[1\times(-6)-2\times5]$

$=(-4):(-22):(-16)=2:11:8$ 答：2：11：8

Ⅵ



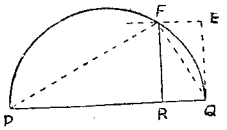

〔已知〕 $K$爲圓 $O$內一定點，$AB$爲過$K$之直徑，$C$爲圓上之任一點。

〔求證〕 $KA>KC$, $KC>KB$

〔證明〕 連結$OC$, 於$\triangle OKC$, $OC+OK>KC$ $OA=OC$

$\therefore OA+OK>KC$ 即 $KA>KC$ 又 $KC>OC-OK$

$OC=OB$ $\therefore KC>OB-OK$ 即 $KC>KB$




〔作圖〕 用$PQ$做直徑作半圓，過$Q$，作$QE\perp PQ$使$QE=AB$，過$E$，引直線$EF$，平行於$PQ$，與半圓交於$F$，再由$F$，作垂直於$PQ$之直線$FR$，把$PQ$分爲二段$PR$，$RQ$，用$PR$，$RQ$爲二邊作矩形，便合所求。

〔證明〕 連結$PF$，$QF$，於$\triangle PFQ$，$\angle PFQ=\angle R$ $FR\perp PQ$

$\therefore PR\cdot RQ=\overline{RF}^2=\overline{QE}^2=\overline{AB}^2$ 因此，以$PR$，$RQ$爲二邊之矩形之面積等於已知正方形$ABCD$，又此矩形之二邊的和等於已知線段$PQ$

〔討論〕 $AB\leqq\frac{1}{2}PQ$時能作圖，$AB>\frac{1}{2}PQ$時不能作圖。

## 省立高雄女子師範學校

❶ $\dfrac{\frac{1}{3}-\frac{1}{2}}{2\frac{4}{5}-1\frac{3}{10}}=\dfrac{\frac{2}{6}-\frac{3}{6}}{2\frac{8}{10}-1\frac{3}{10}}=\dfrac{-\frac{1}{6}}{1\frac{5}{10}}=\dfrac{-\frac{1}{6}}{1\frac{1}{2}}=\dfrac{-\frac{1}{6}}{\frac{3}{2}}=\dfrac{-1}{9}=-\dfrac{1}{9}$

答：$-\frac{1}{9}$

❷ $a^2-b^2+c^2-d^2-2(ac-bd)=a^2-b^2+c^2-d^2-2ac+2bd=(a^2-2ac+c^2)-(b^2-2bd+d^2)=(a-c)^2-(b-d)^2=[(a-c)+(b-d)][(a-c)-(b-d)]=(a-c+b-d)(a-c-b+d)$

答：$(a-c+b-d)(a-c-b+d)$

❸ $\dfrac{x^3-3x^2+3x-1}{8x^3+12x^2+6x+1}=\dfrac{(-1)^3}{(2x+1)^3}=\left(\dfrac{x-1}{2x+1}\right)^3$ $\therefore\sqrt[3]{\dfrac{x^3-3x^2+3x-1}{8x^3+12x^2+6x+1}}=\dfrac{x-1}{2x+1}$

答：$\frac{x-1}{2x+1}$

❹ $4\%\div2=2\%=0.02$ 2年÷0.5年$=4$ $500元\times(1+0.02)^4=500元\times1.08243216=541.21元$（小數第三位以下捨去）

答：541.21元

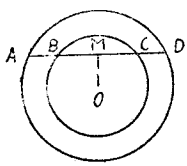
❺ 設此二數爲$x$，$y$，依題意得方程式 $\begin{cases}x+y=11\cdots\cdots①\\ \dfrac{1}{x}-\dfrac{1}{y}=\dfrac{5}{24}\cdots\cdots②\end{cases}$ 由①得 $y=11-x$ ③ ③代入②

$\dfrac{1}{x}-\dfrac{1}{11-x}=\dfrac{5}{24}$ $24(11-x)-24x=5x(11-x)$ $264-24x-24x=55x-5x^2$ $5x^2-103x+264=0$ $(x-3)(5x-88)=0$ $\therefore x=3$ 或 $17\frac{3}{5}$ 代入③ 得 $y=8$ 或 $-6\frac{3}{5}$

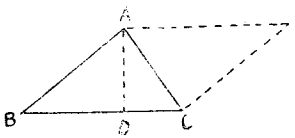
答：3，8 或 $17\frac{3}{5}$，$-6\frac{3}{5}$

❻ $\begin{cases} x-y=4 \cdots\cdots ① \\ x^2+y^2=40 \cdots\cdots ② \end{cases}$ 由①得 $x=y+4$ ③， ③代入② 得 $(y+4)^2+y^2=40$， $y^2+8y+16+y^2-40=0$，$2y^2+8y-24=0$ $y^2+4y-12=0$ $(y-2)(y+6)=0$ ∴ $y=2$ 或 $-6$

代入③ 得 $x=6$ 或 $-2$ 答：$\begin{cases} x=6 \\ y=2 \end{cases}$ $\begin{cases} x=-2 \\ y=-6 \end{cases}$

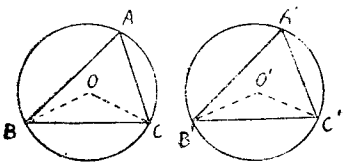
❼ 


〔已知〕 割線 $AD$ 截兩同心圓於 $A, B, C, D$.
〔求證〕 $AB=CD$
〔證明〕 過圓心 $O$， 做 $OM\perp AD$， $AM=DM$，$BM=CM$ ∴ $AM-BM=DM-CM$
即 $AB=CD$

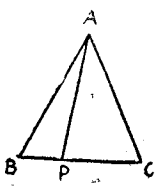
❽ 


〔已知〕 於 $\triangle AEC$， $AD\perp BC$
〔求證〕 $\triangle ABC=\frac{1}{2}AD\cdot BC$
〔證明〕 以 $AB$, $BC$ 爲二邊，作平行四邊形 $ABCE$， 則 $\triangle ABC\equiv\triangle AEC$

∴ $\triangle ABC=\frac{1}{2}\square ABCE=\frac{1}{2}AD\cdot BC$

❾ 


〔已知〕 $\triangle ABC\equiv\triangle A'B'C'$，圓 $O$ 爲 $\triangle ABC$ 之外接圓，圓 $O'$ 爲 $\triangle A'B'C'$ 之外接圓。
〔求證〕 圓 $O$ = 圓 $O'$
〔證明〕 聯結 $OB$, $OC$, $O'B'$, $O'C'$，則 $\angle BOC=2\angle A$ $\angle B'O'C'=2\angle A'$ 而且 $\angle A=\angle A'$ ∴ $\angle BOC=\angle B'O'C'$ 又 $OB=OC$, $O'B'=O'C'$ 即 $OB:O'B'=OC:O'C'$ ∴ $\triangle BOC\equiv\triangle B'O'C'$
∴ $OB=O'B'$ ∴ 圓 $O$ = 圓 $O'$

❿ 


〔已知〕 於 $\triangle ABC$， $AB=AC$， $P$ 爲 $BC$ 上任一點。
〔求證〕 $AP<AB$
〔證明〕 於 $\triangle APC$， $\angle APB>\angle C$ 又 $\angle C=\angle B$
∴ $\angle APB>\angle B$ 於 $\triangle ABP$， $\angle APB>\angle B$
∴ $AP<AB$

## 省立高雄中學

❶ $1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{5}}}}=1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{5}{20+1}}}=1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{5}{21}}}$

$$=1+\frac{1}{2+\frac{1}{63+5}}=1+\frac{1}{2+\frac{1}{68}}=1+\frac{68}{136+21}=1+\frac{68}{157}=1\frac{68}{157}$$

答：$1\frac{68}{157}$

❷ $9\times4=36$　$36\div3=12$　$12+2=14$　$14-1=13$　答：某數是13

❸ $abcx^2-(a^2b^2+c^2)x+abc=(abx-c)(cx-ab)$　答：$(abx-c)(cx-ab)$

❶ (a) $100^5=10000000000$　(b) $\sqrt{2}=\sqrt[6]{2^3}=\sqrt[6]{8}$，$\sqrt[3]{3}=\sqrt[6]{3^2}=\sqrt[6]{9}$，$\sqrt[6]{9}>\sqrt[6]{8}$　$\therefore\sqrt[3]{3}>\sqrt{2}$

答：(a) $10000000000$　(b) $\sqrt[3]{3}>\sqrt{2}$

❺ $\frac{1+i}{1-i}+\frac{1-i}{1+i}=\frac{(1+i)^2+(1-i)^2}{(1-i)(1+i)}=\frac{1+2i+i^2+1-2i+i^2}{1-i^2}=\frac{2(1+i^2)}{1-i^2}$

$=\frac{2(1-1)}{1+1}=0$　答：0

❻ $2\sqrt{27}-6\sqrt{75}-3\sqrt{\frac{1}{3}}+2\sqrt{3}=2\sqrt{9\times3}-6\sqrt{25\times3}-3\sqrt{\frac{3}{9}}$

$+2\sqrt{3}=6\sqrt{3}-30\sqrt{3}-\sqrt{3}+2\sqrt{3}=-23\sqrt{3}$

答：$-23\sqrt{3}$

❼ 假設此三數爲 $x$, $2x$, $3x$, 則 $x^2+(2x)^2+(3x)^2=56$　$x^2+4x^2+9x^2=56$

$14x^2=56$　$x^2=4$　$\therefore x=\pm2$, $2x=\pm4$, $3x=\pm6$　答：$-2$, $-4$, $-6$ 或 2, 4, 6

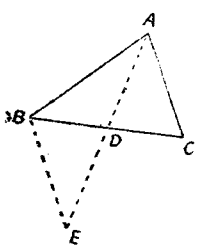
❽ $\begin{cases}x^2+y^2=97\cdots\cdots①\\xy=36\cdots\cdots②\end{cases}$　①+②×2　$(x+y)^2=169$　$\therefore x+y=13$ ③

或 $x+y=-13\cdots\cdots④$　解②、③得 $x=4$, $y=9$

及 $x=9$, $y=4$, 解②、④得 $x=-4$, $y=-9$ 及 $x=-9$, $y=-4$

答：$\begin{cases}x=4\\y=9\end{cases}$ $\begin{cases}x=9\\y=4\end{cases}$ $\begin{cases}x=-4\\y=-9\end{cases}$ $\begin{cases}x=-9\\y=-4\end{cases}$

❹




〔已知〕 於△$ABC$, $AD$ 爲中線

〔求證〕 $AD<\frac{1}{2}(AB+AC)$

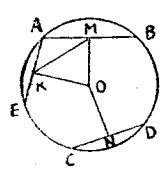
〔證明〕 延長$AD$到$E$, 使$AD=DE$, 連結$BE$,

則 $\left.\begin{matrix}AD=DE\\\angle ADC=\angle EDB\\DC=BD\end{matrix}\right\}\therefore\triangle ADC\equiv\triangle EDB$

$\therefore AC=BE$

於 △$ABE$, $AE<AB+BE$, 即 $2AD<AB+AC$　$\therefore AD<\frac{1}{2}(AB+AC)$

❿



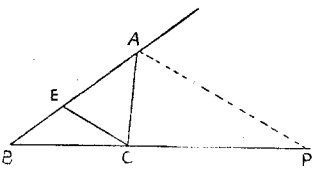

〔已知〕 $AB>CD$ $OM\perp AB$, $ON\perp CD$

〔試證〕 $OM<ON$

〔證明〕 作$AE=CD$, $OK\perp AE$, 則 $OK=ON$, 連結 $KM$, 因 $OM\perp AB$, 故 $AM=\frac{1}{2}AB$, 同樣 $AK=\frac{1}{2}AE$, 而且 $AB>CD$, 故 $AM>AK$

於$\triangle AKM$, $AM>AK$, $\therefore \angle AKB>\angle AMK$, 又 $\angle AKO=\angle AMO=\angle R$, $\therefore \angle OKM<\angle OMK$, 於 $\triangle OKM$, $\angle OKM<\angle OMK$, $\therefore OM<OK$ 又 $OK=ON$ $\therefore OM<ON$

⑪



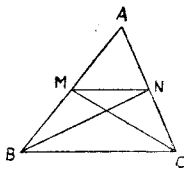

〔已知〕 $AP$爲$\triangle ABC$之外角$CAD$之平分線，$AP$與$BC$延長線交於$P$

〔試證〕 $AB:AC=BP:CP$

〔證明〕 過$C$，作直線$CE$，平行於$PA$，交$AB$於$E$，則$\angle AEC=\angle DAP$，$\angle ACE=\angle CAP$，$AP$爲$\angle CAD$之平分線，$\therefore \angle DAP=\angle CAP$ $\therefore \angle AEC=\angle ACE$ $\therefore AE=AC$

於$\triangle BAP$, $EC/\!/AP$, $\therefore AB:AE=BP:CP$ $\therefore AB:AC=BP:CP$

⑫



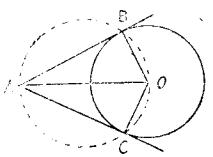

〔已知〕 爲$\triangle ABC$, $AM=MB$, $AN=NC$,

〔試證〕 $\triangle MNB=\frac{1}{2}\triangle MBC$

〔證明〕 於$\triangle ABC$, $AM=MB$, $AN=NC$,

$\therefore MN/\!/BC$ 而且 $MN=\frac{1}{2}BC$, $\triangle MNB$和$\triangle MBC$之高相等，而且$\triangle MNB$之底邊$MN$是$\triangle MBC$之底邊$BC$之一半， $\therefore \triangle MNB=\frac{1}{2}\triangle MBC$

⑬




〔作圖〕 連結$AO$，用$AO$爲直徑畫圓，與已知圓$O$交於二點$A$, $B$, 引直線$AB$, $AC$, 便合所求。

〔證明〕 因爲 $AO$ 是直徑，所以 $\angle ABO=\angle ACO=\angle R$ 因此，$AB$, $AC$是過$A$, 而切於圓$O$之二切線。

〔討論〕 $A$在圓外時，不論其位置如何，常可作此圓之相等二切線。

## 省立高雄女子中學

(一) 是非

❶ − ❷ − ❸ + ❹ − ❺ − 〔註〕 $(x-y)^3=-(y-x)^3$ ❻ − ❼ − ❽ − 〔註〕 $\sqrt{-3}\times\sqrt{-6}=\sqrt{3}i\sqrt{6}i=\sqrt{18}i^2=-\sqrt{9\times2}=-3\sqrt{2}$ ❾ − ❿ − ⓫ − ⓬ + ⓭ − 〔註〕 可作三旁切圓 ⓮ + ⓯ −

(二) 填充

❶ 質數 ❷ 倍數，約數 ❸ $1-2x$ ❹ $d:c$ ❺ $x$, 8 ❻ $-\frac{b}{a}$, $\frac{c}{a}$

❼ +, −, − ❽ $n$, 13, 16, 19, $b$, 32, 64, 128, ❾ $\frac{\sqrt{3}}{2}a$ ❿ $\frac{\text{三角形面積}}{S}$

⑪ $\frac{2}{3}$ ⑫ 此角與對頂角所對二弧的半和。 ⑬ $\frac{\pi m r}{180}$ ⑭ 0

(三) 計算

❶ 5000元×2.5%=125元……每年的保險費
125元×(80−25+1)=7000元……保險費的總額
7000元−5000元=2000元……保險公司賺錢的數目
答：保險公司賺2000元

❷ 2323−23=2300, 4247−22=4225, 5346−21=5325,
$25)\overline{2300 \quad 4225 \quad 5325}$ 求 2300, 4225, 5325的 $G,C,M$, 得25。
$\quad 92 \quad 169 \quad 213$
答：25

❸ $x^3-\dfrac{x^2}{1+\dfrac{1-x}{x-\dfrac{1}{x}}}=x^3-\dfrac{x^2}{1+\dfrac{x(1-x)}{x^2-1}}=x^3-\dfrac{x^2}{1-\dfrac{x(x-1)}{(x-1)(x+1)}}$

$=x^3-\dfrac{x^2}{1-\dfrac{x}{x+1}}=x^3-\dfrac{x^2(x+1)}{x+1-x}=x^3-x^2(x+1)=x^3-x^3-x^2=-x^2$
答：$-x^2$

❹ 作 $4x^2+4(a+c)x-(b^2-4ac)=0$ 之判別式得 $[2(a+c)]^2+4(b^2-4ac)$
$=4(a+c)^2-16ac+4b^2=4(a-c)^2+4b^2\geq 0$ 故知此方程式有二實根。

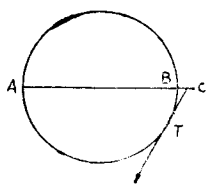
❺ $\begin{cases} x^4+x^2y^2+y^4=133\cdots\cdots① \\ x^2-xy+y^2=7\cdots\cdots② \end{cases}$ ①÷② $x^2+xy+y^2=19$③
比較②、③，$19(x^2-xy+y^2)=7(x^2+xy+y^2)$
$12x^2-26xy+12y^2=0 \quad 6x^2-13xy+6y^2=0 \quad (3x-2y)(2x-3y)=0$
$\therefore x=\frac{2}{3}y\cdots\cdots④$ 或 $y=\frac{2}{3}x\cdots\cdots⑤$ ④代入②得 $\frac{4}{9}y^2-\frac{2}{3}y^2+y^2=7$
$4y^2-6y^2+9y^2=63 \quad 7y^2=63 \quad y^2=9 \quad \therefore y=\pm 3$ 代入④ $x=\pm 2$ 同樣解②，⑤求得根爲 $x=\pm 3,\ y=\pm 2$

答：$\begin{cases} x=2 \\ y=3 \end{cases} \begin{cases} x=-2 \\ y=-3 \end{cases} \begin{cases} x=3 \\ y=2 \end{cases} \begin{cases} x=-3 \\ y=-2 \end{cases}$

❻ 設$A$一人獨做 $x$ 日可成，$B$ 一人獨做 $y$ 日可成，依題意得下列二方程式：
$\begin{cases} \frac{15}{x}+\frac{15}{y}=1\cdots\cdots① \\ \frac{6}{x}+\frac{6+24}{y}=1\cdots\cdots② \end{cases}$ ①×2 $\frac{30}{x}+\frac{30}{y}=2$ ③
③−② $\frac{24}{x}=1 \therefore x=24$ 把此值代入②
$\frac{6}{24}+\frac{30}{y}=1 \quad \frac{30}{y}=1-\frac{1}{4} \quad \frac{30}{y}=\frac{3}{4} \quad 3y=120 \quad \therefore y=40$
答：$A$一人獨做24日可成，$B$一人獨做40日可成

❼ 假定此三數爲 $a-d,\ a,\ a+d$, 則
$\begin{cases} a-d+a+a+d=3\cdots\cdots② \\ (a-d)^2+a^2+(a+d)^2=131\cdots\cdots② \end{cases}$ 化簡①得 $a=1$
化簡②得 $3a^2+2d^2=131$
$2d^2=128 \quad d^2=64 \quad \therefore d=\pm 8 \quad \therefore a-d=1-8=-7 \quad a+d=1+8=9$ 或
$a-d=1-(-8)=9 \quad a+d=1+(-8)=-7$ 答：$-7,\ 1,\ 9$

❽



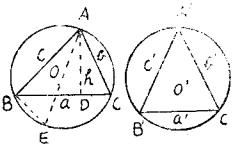

〔題意〕 直徑$AB=30$, $BC=2$ 求切線$CT$的長。

〔解〕 由圓冪定理 $\overline{CT}^2=C\cdot A\cdot CB$

即 $\overline{CT}^2=(2+30)\times 2=64$ $\therefore CT=8$

答：8

❾




〔已知〕 圓$O$, 圓$O'$爲等圓，其半徑爲$R$, $\triangle ABC$爲圓$O$之內接三角形，$a$, $b$, $c$爲其三邊，$\triangle A'B'C'$爲圓$O'$之內接三角形，$a'$, $b'$, $c'$爲其三邊。

〔求證〕 $\triangle ABC:\triangle A'B'C'=abc:a'b'c'$

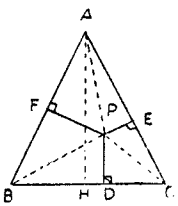
〔證明〕 過$A$, 作$AD$, 垂直於$BC$, 連結$AO$, 延長到$E$, 與圓相交，連結$BE$, 設$AD=h$, 於$\triangle ABE$, $\triangle ADC$, $\angle ABE=\angle ADC=\angle R$, $\angle AEB=\angle ACD$ $\therefore \triangle ABE\backsim\triangle ADC$

$\therefore AB:AD=AE:AC$ 即$c:h=2k:b$, $2kh=bc$ 兩邊乘$a$得 $2Rah=abc$

$\frac{1}{2}ah=\frac{abc}{4R}$ 即$\triangle ABC=\frac{abc}{4R}$, 同樣可證 $\triangle A'B'C'=\frac{a'b'c'}{4R}$

$\therefore \triangle ABC:\triangle A'B'C'=\frac{abc}{4R}:\frac{a'b'c'}{4R}=abc:a'b'c'$

❿




〔已知〕 $ABC$等邊三角形，$P$爲形內任一點，$PD\perp BC$, $PE\perp AC$, $PF\perp AB$

〔求證〕 $PD+PE+PF$ 爲一定

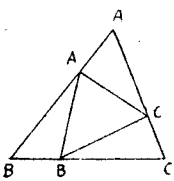
〔證明〕 設$AB=BC=CA=a$, 作 $AH\perp BC$, $AH=h$ 連結 $PA$, $PB$, $PC$,

則$\triangle PBC+\triangle PCA+\triangle PAB=\triangle ABC$

即$\frac{1}{2}a\cdot PD+\frac{1}{2}a\cdot PE+\frac{1}{2}a\cdot PF=\frac{1}{2}ah$

兩邊除以$\frac{1}{2}a$ 得 $PD+PE+PF=h$, $h$爲常數，故$PD+PE+PF$ 爲一定。

⓫




〔已知〕 於$\triangle ABC$, $AA'=\frac{1}{3}AB$, $BB'=\frac{1}{3}BC$, $CC'=\frac{1}{3}CA$

〔求證〕 $\triangle A'B'C'=\frac{1}{3}\triangle ABC$

〔證明〕 於$\triangle AA'C'$, $\triangle ABC$, $\angle A'AC'=\angle BAC$

$\therefore \frac{\triangle AA'C'}{\triangle ABC}=\frac{AA'}{AB}\cdot\frac{AC'}{AC}=\frac{1}{3}\times\frac{2}{3}=\frac{2}{9}$

即 $\triangle AA'C'=\frac{2}{9}\triangle ABC$, 同樣 $\triangle BB'A'=\frac{3}{9}\triangle ABC$, $\triangle CC'B'=\frac{2}{9}\triangle ABC$ $\therefore \triangle A'B'C'=\triangle ABC-\triangle AA'C'-\triangle BB'A'-\triangle CC'B'$

$=\triangle ABC-\frac{2}{9}\times 3\triangle ABC=\frac{1}{3}\triangle ABC$

⑫ 正多邊形的一內角爲162°，所以一外角爲 $180°-163°=18°$
因此，此多角形邊數爲 $360°\div 18°=20$ 答：20邊

## 省立高雄工業職業學校

### I 算術

❶ 250元+45元+35元=330元 330元÷3=110元
110元−45元=65元……甲給乙的款
110元−35元=75元……甲給丙的款
答：甲給乙65元，甲給丙75元

❷ $300元\div(1-\frac{3}{4})=300元\div\frac{1}{4}=300元\times 4=1200元$
1200元−800元=400元
$400元\div(1-\frac{1}{3})=400元\div\frac{2}{3}=400元\times\frac{3}{2}=600元$
答：此人原來存款600元

### I 代數

❸ $\begin{cases}\frac{5}{x}+\frac{6}{y}=3 & ① \\ \frac{15}{x}-\frac{3}{y}=2 & ②\end{cases}$ ①+②×2 $\frac{35}{x}=7$ ∴ $x=5$
代入① $\frac{5}{5}+\frac{6}{y}=3$ $1+\frac{6}{y}=3$ $\frac{6}{y}=2$
∴ $y=3$ 答：$x=5$, $y=3$

❹ $\frac{x-2}{x-1}=\frac{x+1}{x+3}$ $\frac{x-1-1}{x-1}=\frac{x+3-2}{x+3}$ $1-\frac{1}{x-1}=1-\frac{2}{x+3}$
$-\frac{1}{x-1}=-\frac{2}{x+3}$ $\frac{1}{x-1}=\frac{2}{x+3}$ $2(x-1)=x+3$ $2x-2=x+3$
∴$x=5$, 此値不使原方程式之分母爲 0, 故可適合
答：$x=5$

❺ (a) $2xy-x^2-y^2+a^2+b^2+2ab=(a^2+2ab+b^2)-(x^2-2xy+y^2)$
$=(a+b)^2-(x-y)^2=(a+b+x-y)(a+b-x+y)$
(b) $(a+b)^3-(b-a)^3=a^3+3a^2b+3ab^2+b^3-(b^3-3b^2a+3ba^2-a^3)$
$=a^3+3a^2b+ab^2+b^3-b^3+3ab^2-3a^2b+{}^{3}$
$=2a^3+6ab^2=2a(a^2+3b^2)$
答：(a) $(a+b+x-y)(a+b-x+y)$ (b) $2a(a^2+3b^2)$

❻ 設此三整數爲 $x-1$, $x$, $x+1$, 則 $(x-1)^2+x^2+(x+1)^2=110$
$x^2-2x+1+x^2+x^2+2x+1=110$ $3x^2=108$ $x^2=36$ ∴$x=6$或$-6$
故此三整數爲 $6-1=5$, 6, $6+1=7$, 或 $-6-1=-7$, $-6$, $-6+1=-5$ 答：5, 6, 7 或 $-7$, $-6$, $-5$

❼ 假定甲車每小時的速度爲$x$公里，乙車每小時的速度爲$y$公里，依題意得方

程式 $\begin{cases} 4x+9y=240 & ① \\ \dfrac{9y}{x}=\dfrac{4x}{y} & ② \end{cases}$

由②得 $9y^2=4x^2$ $3y=2x$〔因$y>0$, $x>0$, 故 $3y=-2x$ 不成立〕

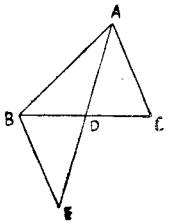
$y=\dfrac{2}{3}x$ ③，③代入① $4x+6x=240$ $10x=240$ $\therefore x=24$,

將此值代入③得$y=16$

答：甲車每小時行24公里，乙車每小時行16公里

## Ⅰ 幾何

❺




〔已知〕 $\triangle ABC$中, $BD=DC$

〔求證〕 $AD<\dfrac{1}{2}(AB+AC)$

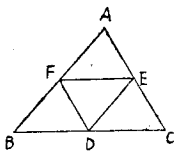
〔證明〕 延長$AD$到$E$, 使 $DE=AD$,

則 $AD=DE$, $DC=BD$, $\angle ADC=\angle EDB$ $\therefore \triangle ADC\equiv\triangle EDB$ $\therefore AC=BE$

於$\triangle ABE$, $AE<AB+BE$ 即$2AD<AB+AC$

$\therefore AD<\dfrac{1}{2}(AB+AC)$

❾




〔已知〕 $\triangle ABC$中, $BD=DC$, $CE=EA$, $AF=FB$

〔求證〕 $\triangle AEF\equiv\triangle BDF\equiv\triangle CDE\equiv\triangle DEF$

〔證明〕 於$\triangle ABC$, $AF=FB$, $AE=EC$ $\therefore FE/\!/BD$

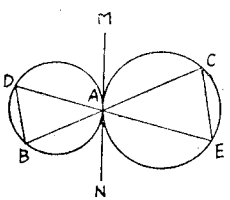
同樣$FB/\!/ED$ 故$EFBD$爲平行四邊形

$\therefore \triangle BDF\equiv\triangle DEF$ 同樣$\triangle CDE\equiv\triangle DEF$,

$\triangle AEF\equiv\triangle DEF$ $\triangle AEF\equiv\triangle BDF$

$\equiv\triangle CDE\equiv\triangle DEF$

❿




〔已知〕 二圓$ABD$, $AEC$外切於$A$, $BC$, $DE$爲過切點$A$之二割線

〔求證〕 $BD/\!/CE$

〔證明〕 引過$A$之公切線$MN$,

則 $\angle ADB=\angle BAN$,

$\angle AEC=\angle CAM$

而 $\angle BAN=\angle CAM$

$\therefore \angle ADB=\angle AEC$

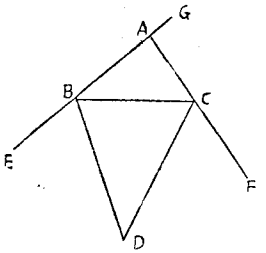
即 $\angle EDB=\angle DEC$ $\therefore BD/\!/CE$

## 省立高雄商業職業學校

1 是非題

❶○ ❷× ❸○ ❹○ ❺○ ❻× ❼○ ❽○ ❾× ❿○

2




〔已知〕 於$\triangle ABC$, $\angle CBD=EBD$, $\angle BCD=\angle FCD$

〔求證〕 $\angle BDC=\frac{1}{2}\angle CAG$

〔證明〕 $\angle BDC=2\angle R-(\angle CBD+\angle BCD)$

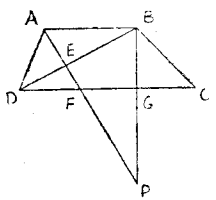
$=2\angle R-\frac{1}{2}(\angle CBE+\angle BCF)$

$=2\angle R-\frac{1}{2}(4\angle R-\angle CAG)$

$=2\angle R-2\angle R+\frac{1}{2}\angle CAG$

$=\frac{1}{2}\angle CAG$

3




〔已知〕 於梯形$ABCD$, $(AB/\!/DC)$ $DF=FG=GC$

〔試證〕 $AP:AE=FP:FE$

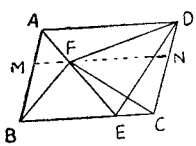
〔證明〕 於$\triangle AEB$, $\triangle FED$, $\angle AEB=\angle FED$, $\angle ABE=\angle FDE$ $\therefore\triangle AEB\backsim FED$

$\therefore AE:FE=AB:DF$ 於$\triangle ABP$, $\triangle FGP$, $\angle ABP=\angle FGP$, $\angle BPA=\angle GPF$ $\therefore\triangle ABP\backsim\triangle FGP$ $\therefore AP:FP=AB:FG$ 因爲 $DF=FG$

$\therefore AB:DF=AB:FG$ $\therefore AP:FP=AE:FE$

$\therefore AP:AE=FP:FE$ (更比定理)

4




〔已知〕 $E$爲$\square ABCD$的$BC$邊上任一點，$F$爲$AE$上任一點

〔試證〕 $\triangle EFD=\triangle BFC$

〔證明〕 過 $F$, 作$MN$, 平行於$BC$, 則 $MN$ 也平行於$AD$, $\triangle ADE$和$\square ABCD$因爲同底等高

$\therefore\triangle ADE=\frac{1}{2}\square ABCD$ ① 同樣$\triangle BFC=\frac{1}{2}\square BCNM$

$\triangle AFD=\frac{1}{2}\square NMAD$ 因此， $\triangle BFC+\triangle AFD=\frac{1}{2}\square BCNM+\frac{1}{2}\square NMAD=\frac{1}{2}\square ABCD$② 比較①, ②得 $\triangle ADE=\triangle BFC+\triangle AFD$, $\triangle EFD+\triangle AFD=\triangle BFC+\triangle AFD$ $\therefore\triangle EFD=\triangle BFC$

5 ❶ $x^2+x=1.0956$ $x^2+x-1.0956=0$

$\therefore x=\frac{-1\pm\sqrt{1+1.0956\times4}}{2}=\frac{-1\pm\sqrt{5.3824}}{2}=\frac{-1\pm2.32}{2}$

$=0.66$ 或$-1.66$ 答$x=0.66, -1.66$

❷ $(x^5+y^5)\div(x+y)=x^4-x^3y+x^2y^2-xy^3+y^4$

答：$x^4-x^3y+x^2y^2-xy^3+y^4$

❸ $\frac{2^n\times(2^{n-1})^n}{2^{n+1}\times 2^{n-1}}\times\frac{1}{4^{-n}}=\frac{2^n\times 2^{n^2-n}}{2^{n+1}\times 2^{n-1}}\times\frac{1}{2^{-2n}}=\frac{2^{n+n^2-n}}{2^{n+1+n-1-2n}}$

$=\frac{2^{n^2}}{2^0}=2^{n^2}$ 答：$2^{n^2}$

❹ $\begin{cases}x+y=1 & ①\\ \frac{x}{y}+\frac{y}{x}=\frac{5}{2} & ②\end{cases}$ 由②得 $2x^2+2y^2=5xy$

$2x^2-5xy+2y^2=0$ $(2x-y)(x-2y)=0$

∴ $y=2x$ ③或 $x=2y$ ④ 解①,③ 得 $x=\frac{1}{3}$，$y=\frac{2}{3}$ 解 ①,④ 得

$x=\frac{2}{3}$，$y=\frac{1}{3}$ 答：$x=\frac{1}{3}$，$y=\frac{2}{3}$ 或$x=\frac{2}{3}$，$y=\frac{1}{3}$

❺ $\frac{\sqrt{x}+3}{\sqrt{x}-2}=\frac{3\sqrt{x}-5}{3\sqrt{x}-13}$ 由和比定理得 $\frac{\sqrt{x}+3}{\sqrt{x}-2}$

$=\frac{3\sqrt{x}-5-3(\sqrt{x}+3)}{3\sqrt{x}-13-3(\sqrt{x}-2)}$ 即 $\frac{\sqrt{x}+3}{\sqrt{x}-2}=\frac{-14}{-7}=2$

$\sqrt{x}+3=2(\sqrt{x}-2)$ $\sqrt{x}+3=2\sqrt{x}-4$ $-\sqrt{x}=-7$

$\sqrt{x}=7$ ∴$x=49$ 驗算後知可適合原方程式 答：$x=49$

❻ 100公分×13%＝13公分 40公分－13公分＝27公分

27公分÷20%＝135公分 350卡－150卡＝200卡

100 公分 $\times\frac{200}{140}=142\frac{6}{7}$公分 $142\frac{6}{7}$公分>135公分

答：$142\frac{6}{7}$公分以上

❼ 設初項爲$a$，公差爲 $d$，則 $\begin{cases}a+9d=-1 & ①\\ a+24d=4 & ②\end{cases}$

②－①得 $15d=5$ ∴ $d=\frac{1}{3}$ 代入① 得 $a+3=-1$ ∴ $a=-4$

第100項 爲 $a+99d=-4+99\times\frac{1}{3}=-4+33=29$

第10項至第25項之和爲 $\frac{25\left\{2(-4)+24\times\frac{1}{3}\right\}}{2}-\frac{9\left\{2(-4)+8\times\frac{1}{3}\right\}}{2}$

$=0+24=24$

第1項至第100項之和爲 $\frac{100\left\{2(-4)+99\times\frac{1}{3}\right\}}{2}=1250$

答：(Ⅰ)$-4$ (Ⅱ)$\frac{1}{3}$ (Ⅲ)29 (Ⅳ)24 (Ⅴ)1250

❽ 所求的日數是6的倍數，同時是7的倍數，就是6和7的公倍數，求6和7的

小公倍數得6×7=42，因此，次回在星期日開會的，是42日後

答：再過42日

❾ 12時+6時3分=18時3分

標準錶 24時 ↓ x分 ↓

這 錶 24時4分 ↓ 18時3分 ↓

$$24:24\text{時}4\text{分}=x:18\text{時}3\text{分}\quad x=\frac{18\text{時}3\text{分}\times 24}{24\text{時}4\text{分}}=\frac{18\frac{1}{20}\times 24}{24\frac{1}{15}}$$

$$=\frac{361}{20}\times 24\div\frac{361}{15}=\frac{\overset{1}{\cancel{361}}}{\underset{1}{\cancel{20}_{\cancel{4}}}}\times\overset{6}{\cancel{24}}\times\frac{\overset{3}{\cancel{15}}}{\underset{1}{\cancel{361}}}=18$$

18時−12時=6時　　答：上午6時

## 省立屏東師範學校

一 是非題

❶ × ❷ ○ ❸ × ❹ ○ ❺ × ❻ ○ ❼ ○ ❽ × ❾ × ❿ ×

二 填充題

❶ 43 ❷ $x+y+z$ ❸ $(6x+y)(x-4y)$ ❹ $\frac{-1\pm\sqrt{17}}{4}$

❺ $\frac{A+B}{2}$，$\pm\sqrt{AB}$ ❻ $\frac{a^2}{b^2}$ ❼ 相似 ❽ $\sqrt{s(s-a)(s-b)(s-c)}$

❾ 135度 ❿ $\frac{\pi mR}{180}$

三 計算證明及作圖題

❶
$$\begin{array}{r|ccc} 7) & 42 & 55 & 70 \\ 2) & 6 & 55 & 10 \\ \hline & 3 & 55 & 5 \end{array}$$

$7\times 2\times 3\times 55=2310$　　答：2310

❷ $\frac{x+7}{3-x}+\frac{3x}{2}=x$　　設$x\neq 3$，兩邊×2(3−x)

$2(x+7)+3x(3-x)=2x(3-x)\quad 2x+14+9x-3x^2=6x-2x^2$

$-x^2+5x+14=0\quad x^2-5x-14=0\quad (x-7)(x+2)=0\quad x=7$ 或$-2$

此兩值都可適合$x\neq 3$　　答：$x=7,\ -2$

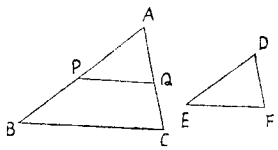
❸ $\sqrt{x+3}-\sqrt{x-5}=2\quad \sqrt{x+3}=\sqrt{x-5}+2$ 兩邊平方

$x+3=x-5+4+4\sqrt{x-5}\quad -4\sqrt{x-5}=-4\quad \sqrt{x-5}=1$ 兩邊平方 $x-5=1\quad \therefore x=6$

檢算 $\sqrt{x+3}-\sqrt{x-5}=\sqrt{6+3}-\sqrt{6-5}=\sqrt{9}-\sqrt{1}=8-1=2$

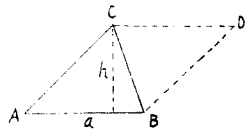
可適合　　答：$x=6$

❹



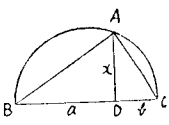

〔已知〕 於$\triangle ABD$, $\triangle DEF$
$\angle A=\angle D$, $\angle B=\angle E$,
$\angle C=\angle F$
〔求證〕 $\triangle ABC\backsim\triangle DEF$
〔證明〕 在$AB$或其延長線上取一點$P$,
使$AP=DE$, 在$AC$或其延長線上
取一點$Q$, 使$AQ=DF$, 則$\triangle APQ\equiv\triangle DEF$ ($AP=DE$,
$\angle A=\angle D$, $AQ=DF$) $\therefore\angle APQ=\angle E$ 因此, $\angle APQ=\angle B$
$\therefore PQ/\!/BC$ $\therefore AP:AB=AQ:AC$ 即 $DE:AB=DF:AC$ 同樣
可證 $EF:BC=DE:AB$ 即 $DE:AB=DF:AC=EF:BC$,
又已知 $\angle A=\angle D$, $\angle B=\angle E$, $\angle C=\angle F$ $\therefore\triangle ABC\backsim\triangle DEF$

❺ 〔已知〕 $\triangle ABC$的高$h$及底$a$

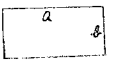



〔求證〕 $\triangle ABC=\frac{1}{2}ah$
〔證明〕 作 $BD/\!/AC$, $CD/\!/AB$,
則$ABDC$是平行四邊形,
因$\triangle ABC=\triangle BCD$(等底等高)
$\square ABCD=ah$ $\therefore\triangle ABC=\frac{1}{2}\square ABCD=\frac{1}{2}ah$

❻ 〔解析〕 設 $a$, $b$ 爲已知矩形之二邊, $x$爲所求之正方形一邊, 則$x^2=ab$
$\therefore x=\sqrt{ab}$ 故$x$爲 $a$, $b$之比例中項。




〔作圖〕 作$BD=a$, 延長 $BD$ 至 $C$, 使 $DC=b$,
用 $BC$ 做直徑畫半圓, 從$D$作$DA\perp BC$,
與半圓相交於 $A$, 用 $AD$爲一邊作正方形
便合所求。




〔證明〕 連結 $AB$ 與 $AC$, 則 $\angle BAC=\angle R$,
$AD\perp BC$ $\therefore\overline{AD}^2=BE\cdot DC=ab$ 故以$AD$
爲一邊的正方形等於已知矩形。
〔討論〕 已知矩形之形狀如何恒有一解。

## 省立屏東中學

*A.* 算術之部

❶

| | 過不足 | 比 | | | | |
|---|---|---|---|---|---|---|
| 3元 | 不足1元 | 0.4 | | 2 | 2 | |
| 3.8元 | 不足0.2元 | | 0.4 | | 2 | 2 |
| 4元 | | | | | | |
| 4.4元 | 過0.4元 | 1 | 0.2 | 5 | 1 | 6 |

$2+2+6=10$

250公斤 $\times\frac{2}{10}=50$公斤

150公斤 $\times\frac{6}{10}=150$公斤

答：3元及3.8元的酒各50公斤，4元4角的酒150公斤

注意：本題除上面的解答外，還有無數的解答，各自再求出一個其他的解答來。

❷ 3000袋－2400袋＝600袋……兩倉貯米袋數的差
600袋÷(3－1)＝300袋……東倉的袋數是西倉袋數的3倍時西倉的貯米袋數。
(2400袋－300袋)÷70袋＝30(日)……所求的日數　　答：30日後

*B.* 代數幾何之部

Ⅰ 是非

❶ － ❷ ＋ ❸ － ❹ － 〔註〕因爲 $a, b, c, d$ 的符號不明白，所以 $a>b, c>d$ 時不能一定可以說是 $ac>bd$, ❺ ＋ 〔註〕把方程式化成 $x^2-7x+12=0$, 再求二根的乘積得 12, ❻ － 〔註〕改爲能被 $x-2$ 除盡就可以。❼ － 〔註〕此點是三角形的外心。❽ ＋ ❾ － ❿ ＋

Ⅱ 選擇

❶ 恒等式 ❷ 反變 ❸ $n+1$項 ❹ $\frac{1}{x+y}$ ❺ 圓周上 ❻ 大於半圓
❼ 鈍角 ❽ 相似形 ❾ 等於其不相鄰二內角的和 ❿ 一條 ⓫ 大於三角形的面積 ⓬ 菱形 ⓭ 不能作內公切線 ⓮ 等於$2\angle R$

Ⅲ 填充

❶ $-4\sqrt{6}$ 〔註〕$\sqrt{-12}\times\sqrt{-8}=\sqrt{12}\,i\sqrt{8}\,i=\sqrt{96}\,i^2$
$=-\sqrt{16\times6}=-4\sqrt{6}$ ❷ 0 ❸ 0.7781 〔註〕$log\ 6=log(2\times3)$
$=log2+log\ 3=0.3010+0.4771=0.7781$ ❹ $\frac{1}{5}$ ❺ 等差，調和

❻ $\frac{x-1}{4x+7}$ ❼ $-i$ 〔註〕$i^{123}=i^{120+3}=(i^4)^{30}i^3=i^3=i^2i=-i$ ❽ 32.5

〔註〕$\frac{10\left[2\times1+(10-1)\times\frac{1}{2}\right]}{2}=\frac{20+45}{2}=\frac{65}{2}=32.5$ ❾ $48m^5n^5p^2$

❿ $-\frac{(b-c)^2+(c-a)^2+(a-b)^2}{(a-b)(b-c)(c-a)}$

Ⅳ 計算

❶ 〔$a$〕$\frac{x}{y}=\frac{3}{4}$ $\therefore x=3k,\ y=4k,\ \frac{5x-3y}{7x+2y}=\frac{15k-12k}{21k+8k}=\frac{3k}{29k}=\frac{3}{29}$

答：$\frac{3}{29}$

〔$b$〕$\frac{a^2+b^2}{a+bi}=\frac{(a^2+b^2)(a-bi)}{(a+bi)(a-bi)}=\frac{(a^2+b^2)(a-bi)}{a^2+b^2}=a-bi$

答：$a-bi$

❷ 〔$a$〕$(1-a^2)(1-b^2)-4ab=1-a^2-b^2+a^2b^2-4ab$
$=(a^2b^2-2ab+1)-(a^2+2ab+b^2)=(ab-1)^2-(a+b)^2$
$=(ab-1+a+b)(ab-1-a-b)=(ab+a+b-1)(ab-a-b-1)$
答：$(ab+a+b-1)(ab-a-b-1)$

〔$b$〕$x^3-7x-6=x^3-x-6x-6=x(x^2-1)-6(x+1)$
$=x(x-1)(x+1)-6(x+1)=(x+1)(x^2-x-6)$

$=(x+1)(x+2)(x-3)$ 答：$(x+1)(x+2)(x-3)$

❸ 〔a〕 $\begin{cases} x^2+xy+y^2=2a\cdots\cdots① \\ x^2-xy+y^2=2b\cdots\cdots② \end{cases}$ ①+② $x^2+y^2=a+b$ ③

③+④×2 $(x+y)^2=3a-b$ ∴ $x+y=\pm\sqrt{3a-b}$ ⑤

③−④×2 $(x-y)^2=3b-a$ ∴ $x-y=\pm\sqrt{3b-a}$ ⑥

解 $x+y=\sqrt{3a-b}$ $x-y=\sqrt{3b-a}$ 得 $x=\frac{1}{2}\left(\sqrt{3a-b}+\sqrt{3b-a}\right)$

$y=\frac{1}{2}\left(\sqrt{3a-b}-\sqrt{3b-a}\right)$, 解 $x+y=\sqrt{3a-b}$

$x-y=-\sqrt{3b-a}$ 得 $x=\frac{1}{2}\left(\sqrt{3a-b}-\sqrt{3b-a}\right)$ $y=\frac{1}{2}$

$\left(\sqrt{3a-b}+\sqrt{3b-a}\right)$ 解 $x+y=-\sqrt{3a-b}$ $x-y=\sqrt{3b-a}$ 得

$x=\frac{1}{2}\left(\sqrt{3b-a}-\sqrt{3a-b}\right)$ $y=\frac{1}{2}\left(-\sqrt{3a-b}-\sqrt{3b-a}\right)$

解 $x+y=-\sqrt{3a-b}$ $x-y=-\sqrt{3b-a}$ 得 $x=\frac{1}{2}\left(-\sqrt{3a-b}\right.$

$\left.-\sqrt{3b-a}\right)$ $y=\frac{1}{2}\left(\sqrt{3b-a}-\sqrt{3a-b}\right)$

答：$\begin{cases} x=\pm\frac{1}{2}\left(\sqrt{3a-b}+\sqrt{3b-a}\right) \\ y=\pm\frac{1}{2}\left(\sqrt{3a-b}-\sqrt{3b-a}\right) \end{cases}$ $\begin{cases} x=\pm\frac{1}{2}\left(\sqrt{3a-b}-\sqrt{3b-a}\right) \\ y=\pm\frac{1}{2}\left(\sqrt{3a-b}+\sqrt{3b-a}\right) \end{cases}$

（複號同順）

〔b〕 $\frac{x}{x-2}-\frac{x+1}{x-1}=\frac{x-8}{x-6}-\frac{x-9}{x-7}$ $\frac{x-2+2}{x-2}-\frac{x-1+2}{x-1}=\frac{x-6-2}{x-6}-\frac{x-7-2}{x-7}$

$1+\frac{2}{x-2}-1-\frac{2}{x-1}=1-\frac{2}{x-6}-1+\frac{2}{x-7}$

$\frac{2}{x-2}-\frac{2}{x-1}=\frac{2}{x-7}-\frac{2}{x-6}$, $\frac{1}{x-2}-\frac{1}{x-1}=\frac{1}{x-7}-\frac{1}{x-6}$

$\frac{(x-1)-(x-2)}{(x-1)(x-2)}=\frac{(x-6)-(x-7)}{(x-6)(x-7)}$ $\frac{1}{(x-1)(x-2)}=\frac{1}{(x-6)(x-7)}$

$(x-1)(x-2)=(x-6)(x-7)$ $x^2-3x+2=x^2-13x+42$ $10x=40$

∴$x=4$ 此值不使原方程式之分母爲 0，故可採 答：$x=4$

❹ 設甲每日行$x$里，則乙每日行 $(x-4)$里，而兩人相會的日數是$\frac{x}{2}$日，依題意得方程式$\frac{120}{x+x-4}=\frac{x}{2}$ $x(x+x-4)=240$ $x(2x-4)=240$

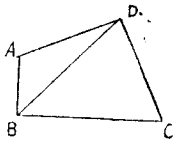
$2x^2-4x=240$ $x^2-2x=120$ $x^2-2x-120=0$ $(x-12)(x+10)=0$

$x+10>0$ ∴ $x-12=0$ $x=12$ $x-4=12-4=8$

答：甲每日行12里，乙每日行8里

Ⅴ 問答

❶




〔已知〕 於四邊形$ABCD$, $\angle ABC=\angle R$, $ADC=\angle R$ $AD>AB$

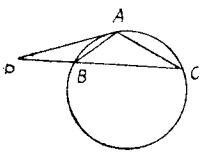
〔求證〕 $BC>CD$

〔證明〕 作對角線$BD$, 於$\triangle ABD$, $AD>AB$

$\therefore \angle ABD>\angle ADB$, 而 $\angle ABD+\angle CBD=\angle R=\angle ADB+\angle CDB$

$\therefore \angle CBD<\angle CDB$, 於$\triangle BCD$, $\angle CBD<\angle CDB$ $\therefore CD<BC$ 卽 $BC>CD$

❷




〔已知〕 $PA$爲切線, $PBC$爲割線

〔求證〕 $PA^2=PB\cdot PC$

〔證明〕 於$\triangle PAB$, $\triangle PCA$,

$\angle PAB=\angle PCA$ $\angle A$爲共通

$\therefore \triangle PAB\backsim\triangle PCA$ $\therefore PB:PA=PA:PC$ $\therefore PA^2=PB\cdot PC$

## 省立屏東女子中學

一、❶ $x^4-5x^2+4=(x^2-1)(x^2-4)=(x+1)(x-1)(x+2)(x-2)$

❷ $x^4+x^2y^2+y^2=x^4+2x^2y^2+y^4-x^2y^2=(x^2+y^2)^2-x^2y^2$
$=(x^2+y^2+xy)(x^2+y^2-xy)=(x^2+xy+y^2)(x^2-xy+y^2)$

❸ $2(x+y)^2-3(x+y)-5=[2(x+y)-5][(x+y)+1]=(2x+2y-5)(x+y+1)$

❹ $8x^6+7x^3-1=(8x^3-1)(x^3+1)=(2x-1)(4x^2+2x+1)(x+1)(x^2-x+1)$

答： ❶ $(x+1)(x-1)(x+2)(x-2)$ ❷ $(x^2+xy+y^2)(x^2-xy+y^2)$
❸ $(2x+2y-5)(x+y+1)$
❹ $(2x-1)(4x^2+2x+1)(x+1)(x^2-x+1)$

二、❶ $\frac{1}{2}(3x+\frac{1}{2})-\frac{2}{3}(x+\frac{1}{3})=\frac{1}{6}$ $3(3x+\frac{1}{2})-4(x+\frac{1}{3})=1$

$9x+\frac{3}{2}-4x-\frac{4}{3}=1$ $54x+9-24x-8=6$ $30x=5$ $\therefore x=\frac{1}{6}$

❷ $\sqrt{1+x}-\sqrt{1-x}=1$ $\sqrt{1+x}=1+\sqrt{1-x}$ 兩邊平方 $1+x=1+1-x+2\sqrt{1-x}$ $2x-1=2\sqrt{1-x}$ 兩邊平方 $4x^2-4x+1=4-4x$

$4x^2=3$ $x^2=\frac{3}{4}$ $\therefore x=\pm\frac{\sqrt{3}}{2}$ Ⅰ $x=\frac{\sqrt{3}}{2}$時 $\sqrt{1+x}-\sqrt{1-x}=\sqrt{1+\frac{\sqrt{3}}{2}}-\sqrt{1-\frac{\sqrt{3}}{2}}=\sqrt{\frac{4+2\sqrt{3}}{4}}-\sqrt{\frac{4-2\sqrt{3}}{4}}$

$=\frac{\sqrt{3}+1}{2}-\frac{\sqrt{3}-1}{2}=1$ 知可適合， Ⅱ $x=-\frac{\sqrt{3}}{2}$時

$$\sqrt{1+x}-\sqrt{1-x}=\sqrt{1-\frac{\sqrt{3}}{2}}-\sqrt{1+\frac{\sqrt{3}}{2}}=\sqrt{\frac{4-2\sqrt{3}}{4}}$$

$$-\sqrt{\frac{4+2\sqrt{3}}{4}}=\frac{\sqrt{3}-1}{2}-\frac{\sqrt{3}+1}{2}=-1 \quad \text{知不適合}$$

答：❶ $x=\frac{1}{6}$　❷ $x=\frac{\sqrt{3}}{2}$

三、$\begin{cases}2x^2-7xy+6y^2=0\cdots\cdots① \\ x^2-3y^2+2y=3\cdots\cdots② \end{cases}$　由①得 $(x-2y)(2x-3y)=0$　∴ $x=2y$ ③

或 $x=\frac{3}{2}y$ ④　③代入②　$4y^2-3y^2+2y-3=0$　$y^2+2y-3=0$　$(y-1)(y+3)=0$　∴ $y=1$ 或 $-3$

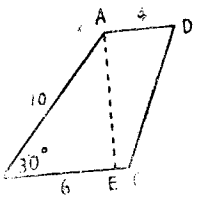
代入 ③ 得 $x=2$或 $-6$　④代入② $\frac{9}{4}y^2-3y^2+2y-3=0$　$9y^2-12y^2+y^2+8y-12=0$　$-3y^2+8y-12=0$　$3y^2-8y+12=0$

∴ $y=\frac{4\pm\sqrt{16-36}}{3}=\frac{4\pm\sqrt{-20}}{3}=\frac{4\pm2\sqrt{5}i}{3}$　代入④ 得

$x=\frac{4\pm2\sqrt{5}i}{2}=2\pm\sqrt{5}i$

答：$\begin{cases}x=2 \\ y=1\end{cases}$　$\begin{cases}x=-6 \\ y=-3\end{cases}$　$\begin{cases}x=2+\sqrt{5}i \\ y=\frac{4+2\sqrt{5}i}{3}\end{cases}$　$\begin{cases}x=2-\sqrt{5}i \\ y=\frac{4-2\sqrt{5}i}{3}\end{cases}$

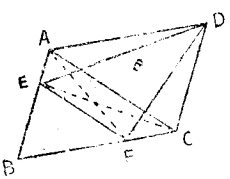
四、$10000元\times(1+0.04)^2=10000元\times1.0816=10816元$　答：10816元

五、 


過 $A$, 作 $AE\perp BC$, 於 $\triangle ABE$, $\angle AEB=\angle R$, $\angle ABE=30°$, ∴ $AE=\frac{1}{2}AB=\frac{1}{2}\times10=5$

∴ 梯形 $ABCD=\frac{(AD+BC)\times AE}{2}=\frac{(4+6)\times5}{2}$

$=25$　答：25

六、 


〔已知〕四邊形 $ABCD$ 是平行四邊形，$EF/\!/AC$

〔求證〕$\triangle ADE=\triangle CDF$

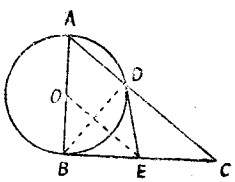
〔證明〕聯結 $AF$, $CE$, 因爲 $EF/\!/AC$,

∴ $\triangle AEC=\triangle AFC$　又 $AB/\!/DC$

∴ $\triangle AEC=\triangle ADE$,　$AD/\!/BC$

∴ $\triangle AFC=\triangle CDF$ 因此，

$\triangle ADE=\triangle CDF$

七、 


〔已知〕於 $\triangle ABC$, $\angle B=\angle R$, $AB$ 爲直徑之圓 $O$ 與 $AC$ 交於 $D$, $DE$ 是過 $D$ 點之切線，$E$ 是 $DE$ 和 $BC$ 之交點。

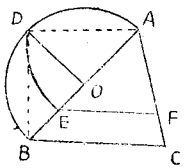
〔求證〕$BE=EC$

〔證明〕聯結 $OE$、$BD$, 則 $OE\perp BD$, 又 $AC\perp BD$,

∴ $OE/\!/AC$, 於 $\triangle ABC$, $AO=OB$,

$OE/\!/AC$,　∴ $BE=EC$

八、




〔作圖〕 $\triangle ABC$ 爲所設之三角形，先求 $AB$ 之中點 $O$，用 $AB$ 做直徑畫半圓於 $\triangle ABC$ 之外方，過 $O$，作 $OD$ 垂直於 $AB$，交圓周於 $D$，聯結 $AD$ 用 $A$ 做圓心，$AD$ 做半徑畫圓交 $AB$ 於 $E$，過 $E$，作 $BC$ 之平行線 $EF$，交 $AC$ 於 $F$，則 $EF$ 便合所求。

〔證明〕 聯結 $DB$，於 $\triangle ADB$，$\angle ADB=\angle R$，$DO\perp AB$，

$\therefore \overline{AD}^2=AO\cdot AB$，於 $\triangle AEF$，$\triangle ABC$，$\angle AEF=\angle ABC$，$\angle A$ 爲共通 $\therefore \triangle AEF\backsim\triangle ABC$ $\therefore \triangle AEF:\triangle ABC=\overline{AE}^2:\overline{AB}^2=\overline{AD}^2:\overline{AB}^2=AO\cdot AB:\overline{AB}^2=AO:AB=1:2$ $\therefore \triangle AEF=\frac{1}{2}\triangle ABC$，即 $\triangle AEF=$梯形$BCFE$

〔討論〕 恒有一解

## 省立屏東農業職業學校

一、算 術

❶ $87\div\left\{20\times0.4+7\times\left[3\frac{3}{4}\times2\frac{2}{5}\div(4.5\div\overline{2-0.5})\right]\right\}+7$

$=87\div\{8+7\times[3.75\times2.4\div(4.5\div1.5)]\}+7=87\div\{8+7\times[9\div3]\}$
$+7=87\div\{8+7\times3\}+7=87\div\{8+21\}+7=87\div29+7=3+7=10$

答： 10

❷

| 1時 | 30分 | 55秒 |
|---|---|---|
| 3) 4時 | 32分 | 45秒 |
| 3 | +60 | +120 |
| 1 | 92 | 165 |
| ×60 | 9 | 15 |
| 60 | 2 | 15 |
| | ×60 | 15 |
| | 120 | 0 |

| 3時 | 1分 | 50秒 |
|---|---|---|
| −2 | 1 | 50 |
| 1 | 0 | 0 |

| 1時 | 30分 | 55秒 |
|---|---|---|
| × | | 2 |
| 2 | 60 | 60) 110 |
| +1 | +1 | 60 |
| 3 | 60) 61 | 50 |
| | 60 | |
| | 1 | |

答： 1時

❸ $(11+9)\div2=10$……大數　　$10-9=1$……小數

答： 大數10，小數1

❹ 2公尺$-$1.5公尺$=$0.5公尺……甲乙二人每秒速度的差
1.5公尺$\times$15$=$22.5公尺……乙先跑出的路程
22.5公尺$\div$0.5公尺$=$45(秒)…甲出發後經過這時間可追上乙
2公尺$\times$45$=$90公尺……出發點和甲追上乙之地點的距離

答： 甲出發後45秒鐘在離出發點90公尺之地方追上乙

二、代 數

⑤ $\frac{a^3b^4}{m^2-1}\times\frac{m+1}{a^2b^3}=\frac{a^3b^4}{(m-1)(m+1)}\times\frac{m+1}{a^2b^3}=\frac{ab}{m-1}$ 答：$\frac{ab}{m-1}$

⑥ $\sqrt{8}+3\sqrt{2}-\sqrt{18}+\sqrt{32}=\sqrt{4\times2}+3\sqrt{2}-\sqrt{9\times2}+\sqrt{16\times2}$
$=2\sqrt{2}+3\sqrt{2}-3\sqrt{2}+4\sqrt{2}=6\sqrt{2}$ 答：$6\sqrt{2}$

⑦ $x^5-x^4-2x^3+2x^2+5x-5=x^4(x-1)-2x^2(x-1)+5(x-1)$
$=(x-1)(x^4-2x^2+5)$ 答：$(x-1)(x^4-2x^2+5)$

⑧ $3a^2+17a+24=(3a+8)(a+3)$ 答：$(3a+8)(a+3)$

⑨ $\begin{cases}3(4x+7y)=87\cdots\cdots①\\2(x+3y)=22\cdots\cdots②\end{cases}$ 由①得 $4x+7y=29$ ③
由②得 $x+3y=11$ ④
④×4−③ $5y=15$ ∴ $y=3$ 代入④ $x+9=11$ ∴ $x=2$
答：$x=2$，$y=3$

⑩ $a^4-13a^2+36=0$ $(a^2-4)(a^2-9)=0$ $(a-2)(a+2)(a-3)(a+3)=0$
∴ $a=2,\ -2,\ 3,\ -3$ 答：$a=\pm2,\ \pm3$

⑪ $x^2=6x-8$ $x^2-6x=-8$ $x^2-6x+9=9-8$ $(x-3)^2=1$
∴ $x-3=1$ 或 $x-3=-1$ ∴ $x=4$ 或 $x=2$ 答：$x=4,2$

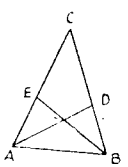
⑫ $\sqrt{-36}\div\sqrt{-9}+\sqrt{-16}\times\sqrt{-4}=6i\div3i+4i\times2i=2+8i^2=$
$2-8=-6$ 答：$-6$

⑬ 設$x$年後，父年爲子年的2倍，則 $30+x=2(6+x)$, $30+x=12+2x$
$x-2x=12-30$ $-x=-18$ ∴ $x=18$ 答：18年後

⑭ 設二人合做，$x$日可成，則 $\frac{1}{x}=\frac{1}{10}+\frac{1}{12}$ $\frac{1}{x}=\frac{6}{60}+\frac{5}{60}$
$\frac{1}{x}=\frac{11}{60}$ $11x=60$ ∴ $x=\frac{60}{11}=5\frac{5}{11}$
答：$5\frac{5}{11}$日

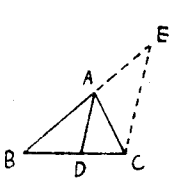
## 三、幾何

⑮



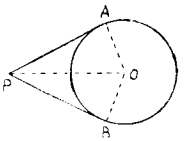

〔已知〕於 $\triangle ABC$, $AC=BC$, $AD$ 是 $\angle A$ 的平分線，$BE$ 是 $\angle B$ 的平分線
〔求證〕$AD=BE$
〔證明〕於$\triangle ABC$, $AC=BC$, ∴ $\angle CAB=\angle CBA$, $AD$ 是 $\angle CAB$ 的平分線 ∴ $\angle CAD=\frac{1}{2}\angle CAB$, $BE$ 是 $\angle CBA$ 的平分線，
∴ $\angle CBE=\frac{1}{2}\angle CBA$ 因此，$\angle CAD=\angle CBE$ 又$\angle C$爲共通，$AC=BC$ ∴ $\triangle CAD\equiv\triangle CBE$ ∴ $AD=BE$

⑯



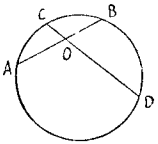

〔已知〕$\triangle ABC$ 內，$AD$ 平分 $\angle BAC$ 交 $BC$ 於 $D$
〔求證〕$BD:DC=AB:AC$
〔證明〕作 $CE/\!/AD$, 與 $BA$ 的延長線交於 $E$, 則 $BD:DC=AB:AE$ $AD$ 是 $\angle BAC$ 的平分線，∴ $\angle BAD=\angle CAD$, $CE/\!/AD$
∴ $\angle BAD=\angle AEC$ $\angle CAD=\angle ACE$ 由是 $\angle AEC=\angle ACE$ 因此，$AE=AC$,
∴ $BD:DC=AB:AC$

⑰



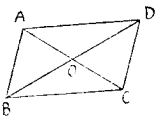

〔已知〕 $P$ 爲圓 $O$ 外的一點，$PA$, $PB$ 爲圓的切線
〔求證〕 $PA=PB$
〔證明〕 聯結 $PO$, $OA$, $OB$, 於 $\triangle OAP$, $\triangle OBP$, $OA=OB$, $OP$ 爲共通， $\angle OAP=\angle OBP=\angle R$ $\therefore$ $\triangle OAP\equiv\triangle OBP$ $\therefore$ $PA=PB$

⑱




〔已知〕 二弦 $AB$, $CD$ 相交於 $O$
〔求證〕 $AO\cdot OB=CO\cdot OD$
〔證明〕 聯結 $AC$, $DB$, 於 $\triangle AOC$, $\triangle DOB$
$\angle CAO=\angle BDO$, $\angle AOC=\angle DOB$
$\therefore\triangle AOC\backsim\triangle DOB$ $\therefore$ $AO:OD=CD=CO\cdot OB$
$\therefore$ $AO\cdot OB=CO\cdot OD$

⑲




〔已知〕 平行四邊形 $ABCD$ 之二對角線 $AC$, $BD$ 之交點爲 $O$
〔求證〕 $AO=OC$, $BO=OD$
〔證明〕 $ABCD$ 是平行四邊形 $\therefore$ $AB=DC$ 於 $\triangle AOB$, $\triangle COD$, $AB=DC$, $\angle OAB=\angle OCD$ $\angle OBA=\angle ODC$ $\therefore$ $\triangle AOB\equiv\triangle COD$
$\therefore$ $AO=OC$, $BO=OD$

## 省立花蓮師範學校

❶ $\sec x-\tan x\ \sin x=\dfrac{1}{\cos x}-\dfrac{\sin^2x}{\cos x}=\dfrac{1-\sin^2x}{\cos x}=\dfrac{\cos^2x}{\cos x}=\cos x$

❷ $1+\dfrac{1}{2+\dfrac{1}{3+\dfrac{1}{4+\dfrac{1}{5}}}}=1+\dfrac{1}{2+\dfrac{1}{3+\dfrac{5}{20+1}}}=1+\dfrac{1}{2+\dfrac{1}{3+\dfrac{5}{21}}}$

$=1+\dfrac{1}{2+\dfrac{21}{63+5}}=1+\dfrac{1}{2+\dfrac{21}{68}}=1+\dfrac{68}{136+21}=1+\dfrac{68}{157}=1\dfrac{68}{157}$

答： $1\dfrac{68}{157}$

❸ $\dfrac{x^2+x-2}{2-x}=\dfrac{4x^2+5x-6}{6-5x}$ 由合比之理 得 $\dfrac{x^2+x-2+2-x}{2-x}=\dfrac{4x^2+5x-6+6-5x}{6-5x}$

$\dfrac{x^2}{2-x}=\dfrac{4x^2}{6-5x}$ $\therefore$ $x^2=0$ 或 $\dfrac{1}{2-x}=\dfrac{4}{6-5x}$ 即 $x=0$. 0

或 $6-5x=4(2-x)$ $6-5x=8-4x$ $-x=2$ $\therefore$ $x=-2$

答： $x=0$, 0, $-2$

❶ 設此等差級數之首項爲 $a$, 公差爲 $d$, 依題意得下列二式：

$\begin{cases} a+2d=7 \cdots\cdots ① \\ a+7d=-18 \cdots\cdots ② \end{cases}$ ②−① $5d=-25$ ∴ $d=-5$ 代入①

$a-10=7$ ∴ $a=17$ 故此等差級數之首項至第八項之和爲 $\frac{[17+(-18)]\times 8}{2}=(-1)\times 4=-4$ 答：−4

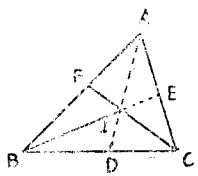
❺ 設這長方形之長爲 $x$ 尺，寬爲 $y$ 尺，則 $\begin{cases} x=y+4 \cdots\cdots ① \\ (x-5)(y+6)-xy=3 \cdots\cdots ② \end{cases}$

由②得 $xy-5y+6x-30-xy-3=0$ $-5y+6x-33=0 \cdots ③$ ①代入③

$-5y+6(y+4)-33=0$ $-5y+6y+24-33=0$ $y-9=0$ ∴ $y=9$

代入①得 $x=13$ 答：長13尺，寬9尺

❻



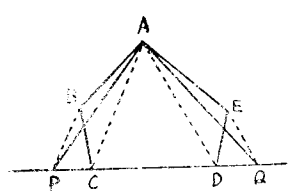

〔證明〕 $\angle B$ 的平分線 $BI$，與 $\angle C$ 的平分線 $CI$ 的交點爲 $I$，由 $I$ 引 $BC$ 的垂線 $ID$，$CA$ 的垂線 $IE$，$AB$ 的垂線 $IF$，又連結 $AI$

則 $\left.\begin{matrix} \angle DBI=\angle FBI \\ BI \text{ 爲共通} \\ \angle D=\angle F=\angle R \end{matrix}\right\}$ ∴ $\triangle BID\equiv\triangle BIF$ ∴ $ID=IF$ 同樣 $ID=IE$

由是 $IF=IE$

又 $AI$ 爲共通 $\left.\begin{matrix} \\ \\ \angle F=\angle E=\angle R \end{matrix}\right\}$ ∴ $\triangle AIF\equiv\triangle AIE$ ∴ $\angle IAF=\angle IAE$ 故可說 $\angle A$ 的平分線亦通過 $I$，由是可說三個內角的平分線同交於一點。

❼

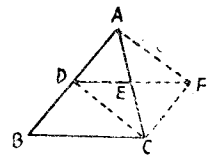



〔作圖〕 已知五邊形爲 $ABCDE$，引對角線 $AC$，$AD$，過 $B$，作 $AC$ 之平行線 $BP$，交 $DC$ 之延長線於 $P$，過 $E$，作 $AD$ 之平行線 $EQ$，交 $CD$ 之延長線於 $Q$，聯結 $AP$，$AQ$ 得 $\triangle APQ$，便合所求。

〔證明〕 因爲 $BP/\!/AC$，∴ $\triangle ABC=\triangle APC$

$EQ/\!/AD$ ∴ $\triangle AED=\triangle AQD$ 因此，$\triangle APQ=\triangle APC+\triangle ACD+\triangle AQD=\triangle ABC+\triangle ACD+\triangle AED=$ 五邊形 $ABCDE$

❽




〔已知〕 於 $\triangle ABC$，$AD=DB$，$AE=EC$

〔求證〕 $DE/\!/BC$ $DE=\frac{1}{2}BC$

〔證明〕 延長 $DE$ 到 $F$，令 $DE=EF$，則 $AE=EC$，$DE=EF$ 即對角線互相等分，所以四邊形 $ADCF$ 是平行四邊形，由是 $AD/\!/\!/FC$，

又 $AD=DB$， ∴ $DB/\!/\!/FC$，一双的對邊相等而且平行所以四邊形 $DBCF$ 也是平行四邊形 ∴ $DF/\!/BC$ 即 $DE/\!/BC$，又 $DF=BC$ 而 $DE=\frac{1}{2}DF$ ∴ $DE=\frac{1}{2}BC$

# 省立花蓮中學

(一) 是非法

❶○ ❷× ❸○ ❹○ ❺× ❻× ❼× ❽○ ❾○ ❿○

(二) 選擇法

⓫① ⓬② ⓭③ ⓮② ⓯① ⓰② ⓱① ⓲②

〔註〕$(1-m)^2-4\times4\times25=0$ $(1-m)^2-400=0$ $(1-m)^2=400$

$-m=\pm20$ ∴ $m=-19$，或 21 ⓳③ ⓴③

(三) 填充法

㉑ $-4$ 〔註〕$\sqrt{-2}\times\sqrt{-8}=\sqrt{2}i\times\sqrt{8}i=\sqrt{16i^2}=-4$ ㉒ $(2n-4)$

直角 ㉓ 等比 ㉔ 圓周率 ㉕ 4分，15度 ㉖ 40度

㉗ $-1$ ㉘ 相等，互補 ㉙ 直線，圓錐曲線 ㉚ $(x-y)(x^2+y^2)$

㉛ 1 ㉜ $\frac{1}{27}$ ㉝ $a,\frac{1}{a}$ ㉞ 14：3 ㉟ $5\sqrt{2}$，$12\frac{1}{2}$

㊱ 450

(四) 計算或證明

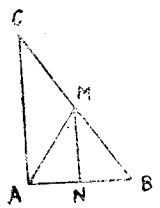
㊲ $\angle A=65°$，$\angle C=50°$，$\angle B=180°-(65°+50°)=65°$

$\angle1=\angle B+\angle C=65°+50°=115°$ $\angle2=\angle C+\angle A=50°+65°=115°$

$\angle3=\angle A+\angle B=65°+65°=130°$

答：$\angle1=115°$，$\angle2=115°$，$\angle3=130°$

㊳




〔已知〕於$\triangle ABC$，$\angle BAC=\angle R$，$BM=MC$

〔求證〕$AM=\frac{1}{2}BC$

〔證明〕作 $MN\perp AB$，則 $MN/\!/CA$，$BM=MC$，

∴ $AN=NB$，於 $\triangle ANM$，$\triangle BNM$，

$AN=NB$，$\angle ANM=\angle BNM$，$MN$ 爲共通

∴ $\triangle ANM\equiv\triangle BNM$ ∴ $AM=BM$ 又

$BM=MC$ ∴ $AM=\frac{1}{2}BC$

㊴ $\triangle A'B'C'\backsim\triangle ABC$，∴ $B'C':BC=A'B':AB$ 設 $BC=x$尺 則

$15:x=6:24$ ∴ $x=\frac{24\times15}{6}=60$ 答：60尺

㊵ 2500元$-$251元$=$2249元 2249元$\div(1+0.73)=1300$元 答：1300元

㊶

| | 每公斤價 | 過不足 | 混合比 | | |
|---|---|---|---|---|---|
| 上茶 | 48元 | +18元 | 1 | | 1 |
| 中茶 | 40元 | +10元 | | 3 | 3 |
| 平均 | 30元 | | | | |
| 下茶 | 24元 | − 6元 | 3 | 5 | 8 |

$1+3+8=12$

$120\text{公斤}\times\frac{1}{12}=10\text{公斤}$……上茶

$120\text{公斤}\times\frac{3}{12}=30\text{公斤}$……中茶

$120\text{公斤}\times\frac{8}{12}=80\text{公斤}$……下茶

答： 上茶10公斤，中茶30公斤，下茶80公斤

〔註〕以外還有很多組解答

⓫ $\frac{1}{a},\frac{1}{b},\frac{1}{c}$ 成等差級數， $\therefore \frac{1}{b}-\frac{1}{a}=\frac{1}{c}-\frac{1}{b}$

$\frac{a-b}{ab}=\frac{b-c}{bc}$ $\frac{a-b}{a}=\frac{b-c}{c}$ $\frac{a}{a-b}=\frac{c}{b-c}=\frac{a+c}{a-b+b-c}=\frac{a+c}{a-c}$

$\therefore a:a-b=a+c:a-c$

⓬ $30公尺\times\frac{2}{3}=20公尺$ $20公尺\div(1-\frac{2}{3})=20公尺\div\frac{1}{3}=20公尺\times3=60公尺$ $60公尺\times2=120公尺$ $30公尺+120公尺=150公尺$

答： 150公尺

⓭ 設甲數爲 $x$，乙數爲 $y$，則 $\begin{cases} xy=20\cdots\cdots① \\ x^2+y^2=41\cdots\cdots② \end{cases}$ ②+①×2 $(x+y)^2=81$

$\therefore x+y=9$ ③ 或 $x+y=-9$ ④，解①、③得 $x=4, y=5$ 或 $x=5, y=4$ 解①、④得 $x=-4, y=-5$ 或 $x=-5, y=-4$

答： $\begin{cases} x=4 \\ y=5 \end{cases}$ $\begin{cases} x=5 \\ y=4 \end{cases}$ $\begin{cases} x=-4 \\ y=-5 \end{cases}$ $\begin{cases} x=-5 \\ y=-4 \end{cases}$

## 省立臺東師範學校

一 算術

❶ (a) $3-\frac{1}{2+\frac{2}{3-\frac{1}{3}}}=3-\frac{1}{2+\frac{6}{9-1}}=3-\frac{1}{2+\frac{6}{8}}=3-\frac{1}{2+\frac{3}{4}}$

$=3-\frac{4}{8+3}=3-\frac{4}{11}=2\frac{7}{11}$ 答： $2\frac{7}{11}$

(b) $30-[\{6+5\times(16-8\div4)\}-50]=30-[\{6+5\times14\}-50]$

$=30-[76-50]=30-26=4$ 答：4

❷ (a) $70-50=20$ $20+60=80$ $80\times5=400$ $400\div4=100$

答：原數是100

(b) 11人+20人=31人 (31人−1人)÷2=15人

15人×15+11人=236人 答：兵士有236人

二 代數

❸ $(x^2+x+1)(x^2+x+2)-12=(x^2+x)^2+3(x^2+x)+2-12$

$=(x^2+x)^2+3(x^2+3x)-10=(x^2+x+5)(x^2+x-2)$

$=(x^2+x+5)(x+2)(x-1)$ 答：$(x^2+x+5)(x+2)(x-1)$

❹ (a) $3x-4=x+2$ $3x-x=2+4$ $2x=6$ $\therefore x=3$ 答：$x=3$

(b) $\frac{x+1}{2}+\frac{x+2}{3}=\frac{x+3}{5}+2x-9$

$15(x+1)+10(x+2)=6(x+3)+60x-270$

$15x+15+10x+20=6x+18+60x-270$　$25x+35=66x-252$

$25x-66x=-252-35$　$-41x=-287$　$\therefore x=7$　　答：$x=7$

❺ $\begin{cases}2x+3y=7 & ① \\ 4x-5y=3 & ②\end{cases}$　①×2−②　$11y=11$　$\therefore y=1$

代入①　$2x+3=7$　$2x=4$　$\therefore x=2$　　答$x=2$, $y=1$

❻ 設此分母爲$\frac{x}{y}$，依題意得方程式$\begin{cases}y-x=30 & ① \\ \frac{x}{y}=\frac{3}{5} & ②\end{cases}$

由分比定理　$\frac{x}{y-x}=\frac{3}{5-3}$　$\frac{x}{30}=\frac{3}{2}$　$\therefore x=\frac{3}{2}\times 30=45$

代入①　$y-45=30$　$\therefore y=75$　$\frac{x}{y}=\frac{45}{75}$　　答：$\frac{45}{75}$

❼ 設張生分得$x$元，王生分得$y$元，則　$\begin{cases}x+y=80 & ① \\ 3x-5y=104 & ②\end{cases}$

①×5+②　$8x=504$　$\therefore x=63$　代入①　$63+y=80$　$\therefore y=17$

答：張生63元，王生17元

❽ 假定乙還要$x$日才把工程做完，則 $3\left(\frac{1}{10}+\frac{1}{15}\right)+\frac{x}{15}=1$

$3(3+2)+2x=30$　$15+2x=30$　$2x=15$　$x=7\frac{1}{2}$

答：還要$7\frac{1}{2}$日

❾ 設此矩形之長爲$x$公尺，寬爲$y$公尺，則$\begin{cases}x=3=y+2 & ① \\ (x-3)^2+5=xy & ②\end{cases}$

由①得　$y=x-5$③，③代入②　$(x-3)^2+5=x(x-5)$

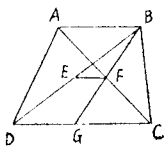
$x^2-6x+9+5=x^2-5x$　$-6x+14=-5x$　$-x=-14$　$\therefore x=14$

代入③得　$y=14-5=9$　　答：長14公尺，寬9公尺

三　幾何

❿ 〔已知〕 梯形$ABCD$ $(AB/\!/DC)$中，$AF=FC$，$BE=ED$

〔求證〕 $EF=\frac{1}{2}(DC-AB)$




〔證明〕 聯結$BF$，延長到$G$，與$DC$相交，

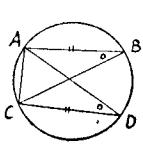
則 $AF=FC$，$\angle AFB=\angle CFG$，

$\angle FAB=\angle FCG$　$\therefore \triangle AFB\equiv\triangle CFG$　$\therefore BF=FG$，

$AB=GC$　於$\triangle DBG$，$BE=ED$，$BF=FG$

$\therefore EF=\frac{1}{2}DG=\frac{1}{2}(DC-GC)=\frac{1}{2}(DC-AB)$

⓫




〔已知〕 $AB$, $CD$是同圓內的等弦

〔求證〕 $\triangle ABC\equiv\triangle ADC$

〔證明〕 已知 $AB=CD$，$AC$爲共通，又 $\overset{\frown}{AB}=\overset{\frown}{CD}$

$\overset{\frown}{AB}+\overset{\frown}{AC}=\overset{\frown}{CD}+\overset{\frown}{AC}$　$\therefore \overset{\frown}{BAC}=\overset{\frown}{ACD}$

$\therefore BC=AD$　$\therefore \triangle ABC\equiv\triangle ADC$

# 省立臺東中學

甲 是非題

❶ － ❷ ＋ ❸ ＋ ❹ ＋ ❺ － ❻ －〔註〕$\sqrt{-2}\sqrt{-8}$
$=\sqrt{2i}\sqrt{8i}=\sqrt{16i^2}=-4$ ❼ －〔註〕如果三點在直線上就不能作圓 ❽ ＋ ❾ － ❿ ＋

乙 填充題

❶ 2，840 ❷ $(x-y)(x^4+x^3y+x^2y^2+xy^3+y^4)$ ❸ $P_2:W_2$ ❹ 對，補 ❺ 垂直平分

丙 選擇題

❶ 2 ❷ 2 ❸ 2 ❹ 1 ❺ 3

丁 計算題

❶ 12月－4月＝8月 8月－2月＝6月

$$\left.\begin{matrix}4000元:3000元:5000元\\12月:\quad 8月:\quad 6月\end{matrix}\right\}=\left\{\begin{matrix}4:3:5\\6:4:3\end{matrix}\right\}=24:12:15=8:4:5$$

$8+4+5=17$ $4080元\div 17=240元$

$240元\times 8=1920元$……甲的所得
$240元\times 4=960元$ ……乙的所得 答：甲得 1920元，乙得 960元，丙得 1200元
$240元\times 5=1200元$……丙的所得

❷ 〔$a$〕$(x^3)^{2x}\cdot(x^{-2})^{3x}=x^{6x}\cdot x^{-6x}=x^0=1$

〔$b$〕$(x^{\frac{1}{2}}+y^{\frac{1}{2}})(x^{\frac{1}{2}}-y^{\frac{1}{2}})=(x^{\frac{1}{2}})^2-(y^{\frac{1}{2}})^2=x-y$

答：〔$a$〕1 〔$b$〕$x-y$

❸ 設其餘二邊爲 $x$ 丈，$y$ 丈，則 $\begin{cases}x+y+13=30\cdots\cdots①\\x^2+y^2=13^2\cdots\cdots②\end{cases}$

由①得 $x+y=17\cdots\cdots③$ 由②得 $(x+y)^2-2xy=169$ $17^2-2xy=169$
$-2xy=169-289$ $-2xy=-120$ $xy=60\cdots\cdots④$

解③，④得 $x=5$，$y=12$，或$x=12$，$y=5$ 答：5尺，12尺

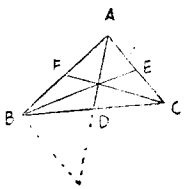
❹ $\begin{cases}\dfrac{a}{x}+\dfrac{b}{y}=1\cdots\cdots①\\[2mm]\dfrac{b}{x}+\dfrac{a}{y}=1\cdots\cdots②\end{cases}$ ①$\times a$－②$\times b$ $\dfrac{a^2-b^2}{x}=a-b$

若$a=b$ 則不定，若$a\neq b$ 則$\dfrac{a+b}{x}=1$

$\therefore x=a+b$ 將此值代入① $\dfrac{a}{a+b}+\dfrac{b}{y}=1$ $\dfrac{b}{y}=1-\dfrac{a}{a+b}$

$\dfrac{b}{y}=\dfrac{b}{a+b}$ $\therefore y=a+b$ 答：$a=b$時不定

$a\neq b$時 $x=a+b$，$y=a+b$

❺ 


〔已知〕 $AD$, $BE$, $CF$爲$\triangle ABC$之三中線

〔求證〕 $AD+BE+CF<AB+BC+CA$

〔證明〕 延長$AD$到$A'$,使$AD=DA'$, 連結 $A'B$

則 $AD=DA'$ $CD=DB$, $\angle ADC=\angle BDA'$ ∴ $\triangle ADC\equiv\triangle A'DB$

∴$AC=A'B$, 於$\triangle ABA'$, $AB+A'B>AA'$

即$AB+AC>2AD$……① 同樣可證

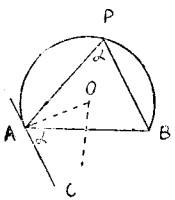
$AB+BC>2BE$…② $AC+BC>2CF$…③

①+②+③ $2(AB+BC+AC)>2(AD+BE+CF)$

∴ $AB+BC+AC>AD+BE+CF$

❻ 〔解析〕 假設$APB$爲以定線段$AB$爲弦，含定角$\alpha$的弓形，過$A$作切線$AC$,

則$\angle BAC=\angle APB=\alpha$

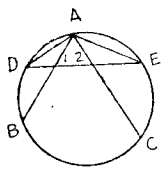



〔作圖〕 過$A$作直線$AC$,使$\angle BAC=\alpha$, 過$A$作$AC$的垂線 $AO$, 與 $AB$ 的垂直平分線交於$O$,用$O$做中心$OA$做半徑畫圓弧 $APB$.

〔證明〕 因$AO\perp AC$所以$AC$是切線，

∴ $\angle APB=\angle BAC=\alpha$ 故弓形 $APB$ 合於所求。

〔討論〕 $AB$的上下各可作一個。

❼ 


〔已知〕 $\overset{\frown}{AE}=\overset{\frown}{EC}$, $\overset{\frown}{AD}=\overset{\frown}{DB}$

〔求證〕 $\angle 1=\angle 2$

〔證明〕 聯結 $AD$, $AE$, 因爲 $\overset{\frown}{AE}=\overset{\frown}{EC}$

∴$\angle ADE=\angle CAE$ ① 因爲 $\overset{\frown}{DB}=\overset{\frown}{AD}$

∴$\angle BAD=\angle AED$ ②, ①+②

得 $\angle ADE+\angle BAD=\angle CAE+\angle AED$

而且. $\angle ADE+\angle BAD=\angle 1$, $\angle CAE+\angle AED=\angle 2$ ∴ $\angle 1=\angle 2$

## 省立馬公中學

❶ $32\div 8\times 4+56\div 14\times 2-36\div 12\times 3=4\times 4+4\times 2-3\times 3=16+8-9=15$

答： 15

❷ 5元×20＝100元　　165元－100元＝65元　　10元－5元＝5元

65元÷5元＝13……十元鈔票張數　　20張－13張＝7張……五元鈔票張數

答： 十元鈔票13張， 五元鈔票7張

❸ $2x^2+3x-2=0$　　$(2x-1)(x+2)=0$　　∴ $2x-1=0$ 或 $x+2=0$

即 $x=\frac{1}{2}$ 或 $-2$　　答： $x=\frac{1}{2}$, $-2$

❹ 等差中項 $\frac{4+16}{2}=10$,　等比中項 $\pm\sqrt{4\times 16}=\pm\sqrt{64}=\pm 8$

調和中項 $-\frac{2\times4\times16}{4+16}=\frac{128}{20}=6.4$

答：等差中項10，等比中項±8，調和中項6.4

❺ $\begin{cases}x^2+y^2=13\cdots\cdots①\\x^2-2y^2=1\cdots\cdots②\end{cases}$ ①−② $3y^2=12$ $y^2=4$ ∴ $y=\pm2$ 以此值代入①

$x^2+4=13$ $x^2=9$ ∴ $x=\pm3$

答：$\begin{cases}x=3\\y=2\end{cases}$ $\begin{cases}x=3\\y=-2\end{cases}$ $\begin{cases}x=-3\\y=2\end{cases}$ $\begin{cases}x=-3\\y=-2\end{cases}$

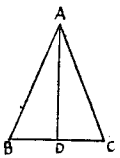
❽ 設甲有 $x$元，乙有 $y$元，丙有乙元 則 $\begin{cases}x+y=30\cdots\cdots①\\y+z=50\cdots\cdots②\\z-2x=7\cdots\cdots③\end{cases}$

①−② $x-z=-20$ ④，③+④ $-x=-13$ ∴ $x=13$

以此值代入① $13+y=30$ ∴ $y=17$ 再代入③ $z-36=7$ ∴ $z=33$

答：甲有13元，乙有17元，丙有33元

❼



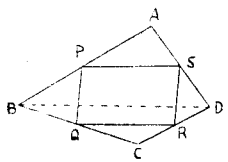

〔已知〕於 $\triangle ABC$, $AB=AC$, $AD\perp BC$

〔求證〕$BD=DC$

〔證明〕於 $\triangle ABD$, $\triangle ACD$, $AD$ 爲共通，$\angle ADB=\angle ADC=\angle R$, $AB=AC$

∴ $\triangle ABD\equiv\triangle ACD$ ∴ $BD=DC$

❽




〔已知〕於四邊形 $ABCD$, $AP=PB$, $BQ=QC$, $CR=RD$, $AS=SD$

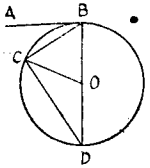
〔求證〕四邊形 $PQRS$ 是平行四邊形

〔證明〕於 $\triangle ABD$, $AP=PB$, $AS=SD$,

∴ $PS\parallel\frac{1}{2}BD$, 同樣可證

$QR\parallel\frac{1}{2}BD$, 因此 $PR\parallel QR$, 故四邊形 $PQRS$ 是平行四邊形

❾




〔已知〕圓 $O$ 內，切於點 $B$ 的切線 $BA$ 及過 $B$ 的弦 $BC$

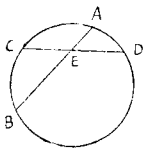
〔求證〕$\angle ABC=\frac{1}{2}$弧 $BC$ 的度數

〔證明〕作直徑 $BD$，聯結 $DC$, $OC$, 則 $\angle ABD=\angle R$, $\angle BCD=\angle R$ $\angle BDC+\angle DBC=\angle R$

∴ $\angle ABD=\angle BDC+\angle DBC$ $\angle ABC+\angle DBC=\angle BDC+\angle DBC$ ∴ $\angle ABC=\angle BDC$ 而

$\angle BDC=\frac{1}{2}\angle BOC=\frac{1}{2}$弧 $BC$的度數 ∴ $\angle ABC=\frac{1}{2}$弧 $BC$ 的度數

❿




〔已知〕兩弦 $AB$, $CD$ 相交於 $E$. $CE=ED$

〔求證〕$CE=\sqrt{AE\cdot EB}$

〔證明〕由圓冪定理 $CE\cdot ED=AE\cdot EB$ 因爲$CE=ED$

故 $\overline{CE}^2=AE\cdot EB$ 即 $CE=\sqrt{AE\cdot EB}$