# Primary Three Contest Problem

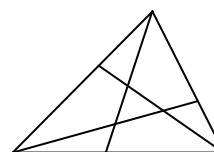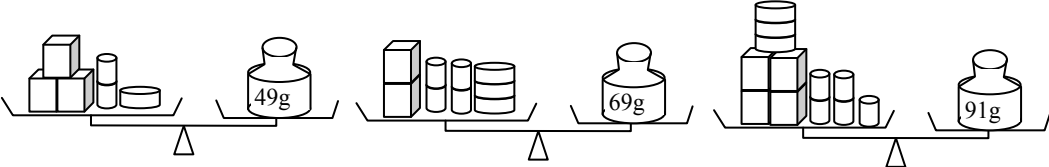**Examination Time：90 min   Total Point：100points   Score：_____**

- Contestant must write down the answer of each problem in the blank, answer with erasure will not be credited!
- For Problem 17 and 18, presentation of solution on the space provided is a must, no credit will be given if only the final answer is written down in the paper!

| Multiple Choice | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Answer | | | | | | | | |
| Fill-in the blank | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Answer | | | | | | | | |

## A. Multiple-Choice Problems. (5 points each, a total of 40 points)
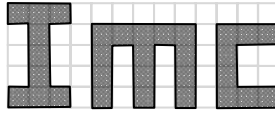
1. Compute: 12+21+102+120+201+210.
   A.633          B.636          C.663          D.666

2. The first four terms of a series of numbers are 2, 0, 1, 3 and a pattern has been discovered that the 4$^{th}$ term happens to be the sum of the first 3 terms. The same pattern will be applied for all the succeeding terms; that is the 5$^{th}$ term is the sum of the first 4 terms, the 6$^{th}$ term is the sum of the first 5 terms …, the 100$^{th}$ term is the sum of the first 99 terms. What is the unit's digit of the 100$^{th}$ term?

   A.2          B.4          C.6          D.8

3. Refer to the diagram at the right, how many triangles are there of different sizes?
   A.15          B.16          C.17          D.18

4. The 26 letters of the English alphabet are arranged in a circle of clockwise direction. Let the letter *I* represents as 1, *J* for 2, and *K* for 3,… and finally the letter *H* represents 26. What is the sum of all those three numbers represented by *IMC*?
   A. 31          B.27          C.24          D. 21

5. Four friends Aileen, Betty, Cathy and Daisy went shopping. After Cathy spent $30, her money was still more than Aileen's by $30. If Cathy gave Daisy $30, Cathy's money would still be more than Daisy's money by $30. If Betty gave Daisy $30, then Betty's money would be less than Daisy's by $30. By how much more is Betty's money than Aileen's at the start?
   A.0          B.30          C.60          D.120

6. There are some four-digit numbers such that the hundreds' digit is the product of two adjacent digits while the tens' digit is also the product of two adjacent digits. How many such kind of four-digit numbers are there?
   A.9          B.19          C.90          D.99

7. The police arrested four suspects *A, B, C, D* for bank theft. When each of the suspects was investigated, the following ensued: *A* said "C robbed the bank", *B* said: "I did not rob the bank", *C* said: "I did not rob either", *D* Said, "If B did not rob, then it was I who robbed the bank". Who must be the suspect since only one of them is telling a lie?
   A. suspect *A*          B. suspect *B*          C. suspect *C*          D. suspect *D*

8. The three weighing scales are balanced as shown. What is the sum weight of these 3D shapes in grams?



   A. 20          B.22          C.27          D.31

## B. Fill in the blank.（5 points each, a total of 40 points）

9. If the area of each small square at the right is 1 square unit, then what is the total perimeter of IMC as shown in the figure?



10. Arrange the letters of the English alphabet *A* to *Z* in one line from left to right, then perform the following operations: First cross out letter *A* and then every other letter alternately, continue the same process until one letter is left. What letter is not crossed out?

11. A basket of apples can be shared equally to a group of 10 kids and each kid gets the same number of apples. If each boy gets one more apple and each girl must take one less apple, then there will be an excess of 4 apples. Suppose the number of boys remains the same and one girl has been removed from the group so that each girl will get one more apple, then how many apples are there in the baskets?

12. How many ways can the figure at the right be traced without lifting your finger off the paper? You are not allowed to trace any line segments more than once.

13. Andy and Barry bringing a total of 150 dollars with them to buy some school items. Andy spent half of his money to buy a robot toy while Barry spent 10 dollars to buy a math book. After paying the items, Andy's remaining money is now three times that of Barry's remaining money. How much money had Barry have at first?

14. Place each of the digits 1, 2, 3, 4 and 5 once in the $\square$ to make the following whole statement true. What must be the largest possible number to be filled in $\bigcirc$?
$[(\bigcirc-\square)\times\square+\square]\div\square=\square$

15. Tom wants to buy some school supplies from the internet. Here are the items and their prices: a ball pen costs 3 dollars each, a notebook sells at 6 dollars each, and an eraser costs 1 dollar. He gets free shipment if his total bill reached the amount of $40. In how many different ways can he purchase three kinds of items for him to get free shipment?

16. The figure at the right is a vertical addition problem. Fill in the digits 1 to 9 in the $\square$ once such that two digits with difference of 1 must be arranged in either horizontal adjacent or vertical adjacent. What must be the four-digit numbers in the final answer of this addition problem?

```
        3
      □ □ □
  +   □ □ □
  ─────────
    □ □ □ 0
```

C. Problem Solving. (10 points each, a total of 20 points. Show your detailed solution on the space below each question)

17. A certain country has a total of 160 delegates to participate in the 9th IMC Singapore. They booked a hotel and requested for availability of rooms. The hotel can only give twin, triple and quadruple sharing rooms. It was found out that the availability of the number of quadruple sharing rooms is three times the number of twin sharing rooms. Likewise, the number of delegates staying at the quadruple room is two times the number of delegates staying at triple rooms. How many triple rooms were given to the IMC delegations?

18. What is largest possible number of chess pieces that are less than 100 which can be arranged in a 2-layer empty square and in a 3-layer empty square as shown in the right? (The diagram is just a guide, do not use it to count directly)