Malaysia International Mathematics Olympiad Competition 2015

Saturday 21st of November, 2015

9.30 am – 11.00 am

- Middle Primary Paper -

Jointly Organised by :

Persatuan Matematik Olympiad Malaysia (PERMATO)
Sekolah Jenis Kebangsaan (Cina) Lick Hung Subang Jaya
Sekolah Jenis Kebangsaan (Cina) Lai Meng Bukit Jalil, Kuala Lumpur
E Mathematics Olympiad System

马来西亚数学奥林匹克学会
力行国民型华文学校
黎明华文小学
数学奥林匹克学研中心
联合主办

Instructions:

- **Do not turn to the first page until you are told to do so.**
- **Write down your name, your contestant number and your school's name on the answer sheet.**
- **Write down all answers on the answer sheet. Only Arabic NUMERICAL answers are needed.**
- **Answer all 25 problems. The total is 120 points. For problems involving more than one answer, partial credit will be given for any correct answer. There is no penalty for a wrong answer.**
- **Diagrams shown may not be drawn to scale.**
- **No calculator or calculating device is allowed.**
- **Answer the problems with pencil, blue or black ball pen.**
- **All papers shall be collected at the end of this test.**

Section A (4 marks each)

A 组 (每题 4 分)

1. Count 计算：$10 \times (\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20}) = ?$

2. Fill the correct answer in the blank as shown in the figure below.
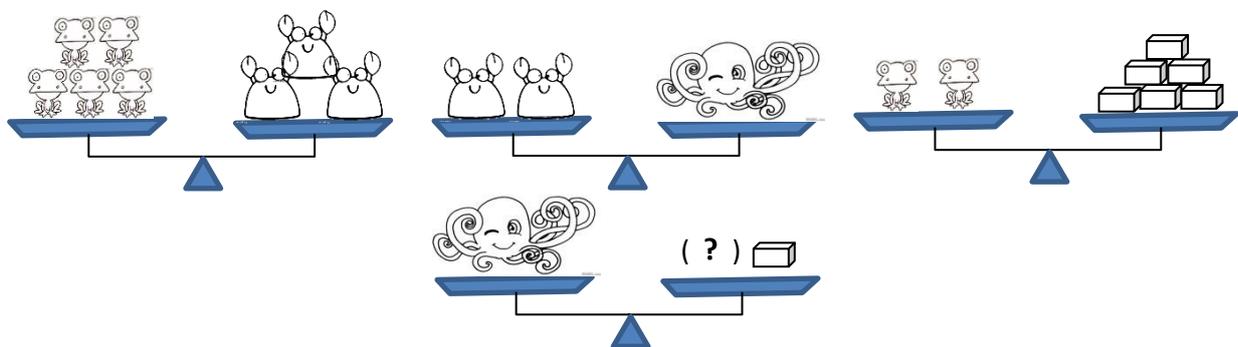
下图的空格内应填上什么数？

| 24 | 36 | 72 | 90 | |

3. Jr White has some white and black chocolates. The number of the black chocolates is 4 times more than the white chocolates. The total number of the chocolates is 30. Find the number of the black chocolates that Jr White has?

小白有一些巧克力，已知黑巧克力的数量比白巧克力多 4 倍，两种巧克力共有 30 颗。请问小白有多少颗黑巧克力？

4. How many are equivalent to the weight of one ?
多少个 的重量相等于一只 的重量？

5. An apple costs $5.00 while an orange costs $2.00. Nobita bought a total of 12 that costs him $45.00. How many apples had Nobita bought?

每个苹果$5.00，每个橘子$2.00。大雄共买了 12 个，用了$45.00。请问大雄买了多少个苹果？

6. A snail is climbing up a wall. The height of the wall is 35m. In the daytime, the snail will climb up 7m but falls 4m at night time. It begins to climb at 2m from the ground. What is the total climbing distance in meter, when the snail reaches the top of the wall?

蜗牛爬墙，墙高 35 公尺，白天上升 7 公尺，晚上下降 4 公尺，离地 2 公尺开始向上爬，请问：爬到墙顶时，爬行的总距离为多少公尺？

7. As shown, find the total area of the shaded region.

如图，求阴影部分的面积。
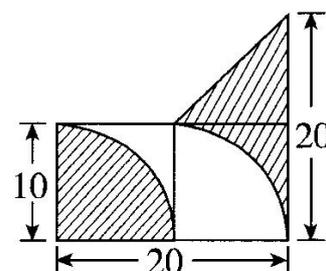
8. Mandy used $13.50 to buy 6 pieces of pencils and 5 exercise books. The price of 3 pencils is same as the price of 2 exercise books, what is the price of one pencil?

小琪买了 6 支铅笔和 5 本笔记本，共用去$13.50。 已知 3 支铅笔的价钱与 2 本笔记本的价钱一样， 1 支铅笔的价钱是多少呢？

9. There are 2 natural numbers, a and b.
   a $*$ b = the sum of the quotient and its remainder when a is divided by b,
   example 4 $*$ 3 = 2 ， 2 $*$ 3 = 2.

   A) （188 $*$ 3 ） $*$ 8 = ?
   B) X $*$ 18 = 7 ， X is a natural number between 80 to 100, what is the value of X.

   对于两个自然数 a 和 b ， a $*$ b 表示 a 除以 b 的商与余数的和， 例如
   4 $*$ 3 = 2 ， 2 $*$ 3 = 2.

   A） （188 $*$ 3 ） $*$ 8 = ?
   B） X $*$ 18 = 7 ， X 为 80 至 100 之间的自然数， 求 X 的值。

10. In a children's day party, fried chickens were equally distributed among 34 pupils, and they had forgotten to include their class teacher. After redistribution took part, every pupil was getting 1 piece lesser than the previous arrangement. How many pieces of fried chickens were prepared in the first place?

在儿童节的茶点上，原本班上 34 位同学平分香脆的炸鸡块，忘了分给级任老师；重新平分这些炸鸡块，每位同学比原来少拿 1 块。问共有多少炸鸡块？

Section B (5 marks each)
B 组 (每题 5 分)

11. In a fruit farm, there are 340 apple and orange trees. The number of apple trees is 20 more than 3 times of the orange trees. How many apple trees are there?

果园里种了苹果树及橘子树共 340 棵，已知苹果树的棵数比橘子树的三倍多 20 棵，问苹果树有多少棵？

12. On a square-shaped paper ABCD, folds the paper according to the line EF to make an equal half. Again, generates an equal half to each side of the paper, where A and B meet each other. As shown in the graph below, what is X?

将一张正方形的卡纸 ABCD 沿着直线 EF 对折成左右各二分之一部分，并使卡纸的两个角 A 与 B 相重合所构成的图形如下图。求 x。
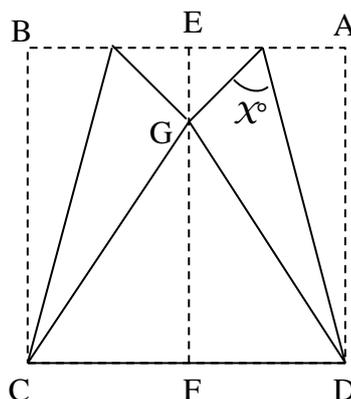
13. In the following equation, x, y and z are different digits, and $\overline{yz}$ and $\overline{zy}$ are two-digit numbers.
$$x \times \overline{yz} \times \overline{zy} = 2015$$
Find the value of x + y + z.

下面算式中的 x，y，z 为不同的数字，其中 $\overline{yz}$ and $\overline{zy}$ 是两位数，
$$x \times \overline{yz} \times \overline{zy} = 2015$$
求 x + y + z 之值。

14. A project needs 1 master and 3 apprentices to complete in 4 days. The same project could be completed in 3 days if it is done by 2 masters and 1 apprentice. Assume the work efficiency of every master and apprentice are constant everyday. How many days are needed for 1 apprentice to complete this project.

一件工程由 1 个师傅带 3 个学徒做 4 天做完，或是由 2 个师傅带 1 个学徒做 3 天做完，如果每个师傅每日的工作量相同，每个学徒也相同，请问：1 个学徒单独做这份工作要多少天？

15. Every day, Samy has a breakfast, a lunch and a dinner. The options for each meal are:

Breakfast : Coffee and/or Cake
Lunch   : Fried Rice and/or egg
Dinner   : Noodles and/or Pizza

One day Samy eats four items. In how many different ways can he do this ?

三美每日三餐，其选择的食品种类如下表所示。

早餐 : 咖啡 /蛋糕（可选择一种或两种）
午餐 : 炒饭 /煎蛋（可选择一种或两种）
晚餐 : 面食 /比萨（可选择一种或两种）

一天，他共吃了四种食品，请问三美有多少种不同的选择？

16. There are some trees planted around the pond. Alice and Bob were having a walk around the pond at the same direction, meanwhile counting the number of trees. Due to different of the departure location among Alice and Bob, Bob's counted the 20th tree while Alice got the 7th tree; When Bob reached the number of 7th, it was Alice 94th tree.
What is the total number of trees planted around the pond?

池塘的周围栽种了一些树，小红和小明沿着同一个方向绕水池散步，边走边数树的棵数。由于两个人出发地点不同，因此小明数第 20 棵是小红的第 7 棵；小明数第 7 棵是小红的第 94 棵。那么池塘四周栽种了多少棵树？

17. Natural numbers A and B, $540 \times A = B \times B$, find the minimum value of A.
540 × A = B × B。已知 A、B 均为自然数，求 A 的最小值。

18. A double storey public bus has 79 seats. The bus starts the journey with full vacancy. 1 passenger embarks the bus at the 1st station, 2 passengers embark the bus at 2nd station, following by the 3rd station with 3 passengers. Additionally, there is 1 passenger disembarks from the bus in every station, starting from the 2nd station. Following this pattern of passenger dispatching, please state the station where the bus is fully occupied with passengers.

一辆双层公共巴士有 79 个座位，空车出发，第一站上一个乘客，第二站上两个乘客，第三站上三个乘客，并且从第二站开始每一站有一个乘客下车，以此类推，那么第几站时，车上坐满乘客？

19. Find the figure that comes next in the series. 下一个图形是哪一个？

(A)   (B)   (C)   (D)
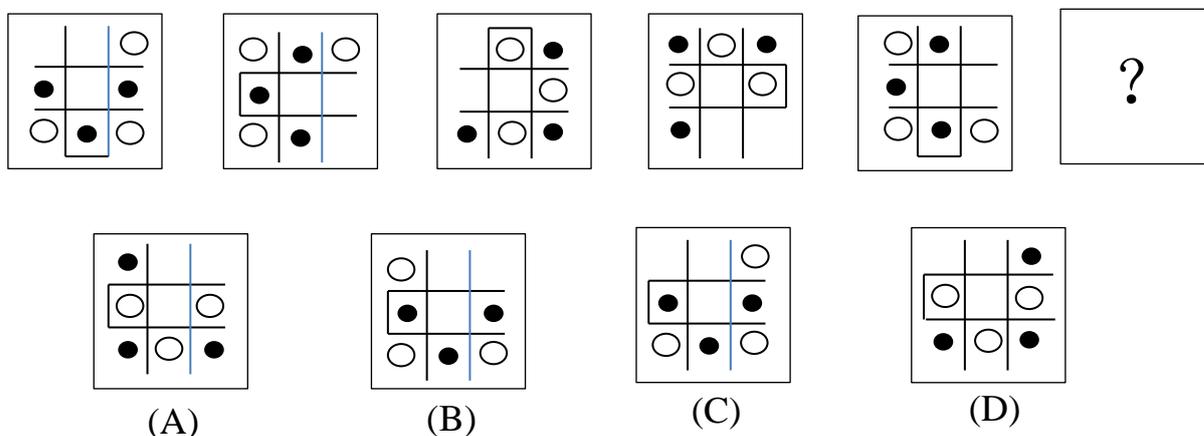
20. The students in 5W class registered for domestic and international Mathematics Olympiad Competition. There are 32 students registered for international category meanwhile 21 students registered for domestic category, 16 students registered for both categories, while there were 2 students not participating at all. How many students were there in class 5W?
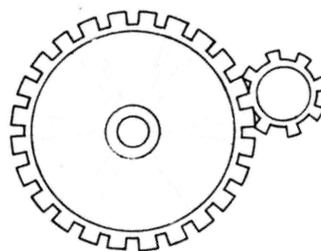
老师让 5W 班的学生自由报名国内奥数赛和国际奥数赛。其中有 32 位报了国际奥数赛，21 位报了国内奥数赛，16 位两项都报，2 位两项都不报。请问 5W 班共有多少位学生？

Section C (6 marks each)
C 组 (每题 6 分)

21. There is a Cog-wheel that has 8 teeth. It is coupled with a cog-wheel of 24 teeth. How many times the small cog-wheel must rotate on its axis to circle around the big one？

小齿轮有 8 个牙，大齿轮有 24 个牙，如果大齿轮转一圈，小齿轮转了多少圈？

22. There is a 5-digit number integer, 80□□9, when this number divided by 13 or 37, both will get a remainder of 2. What is the value of this integer?

五位整数 80□□9，用 13 去除、用 37 去除皆余 2，请问：这个五位整数是多少？

23. There are total of 9 persons A~I. One of them got a scholarship. Below are their conversations. There are only 3 persons who are honest to their response. Who is the scholarship holder？

A ： "It is E。"
B ： "It is me。"
C ： "It is B。"
D ： "It is not E。"
E ： "It is either B or H。"
F ： "It is E。"
G ： "It is not B。"
H ： "It is neither B nor me。"
I ： "What H was telling is true。"

有 A～I 共 9 人，其中 1 个人获得大学奖学金。向他们询问谁获得奖学金，他们的回答如下。其中，说实话的只有 3 个人。那么，获得奖学金的是谁呢？

A：　"是 E。"
B：　"是我。"
C：　"是 B。"
D：　"不是 E。"
E：　"是 B 或 H。"
F：　"是 E。"
G：　"不是 B。"
H：　"不是 B 也不是我。"
I ：　"H 所说的是事实。"

24. Find the unit digit of $1\times1+2\times2+3\times3+\cdots+2014\times2014+2015\times2015$.
    请问：$1\times1+2\times2+3\times3+\cdots+2015\times2015$ 的答案的个位数字是多少？

25. There is a pond having a perimeter of 500m. Ali and Hassan walk around the pond from the same departing point in opposite direction, and they will meet every 5 minutes. If they are walking in the same direction, they will meet every 50 minutes. Ali is walking faster than Hassan. How many meters does Hassan walk in a minute?

    某池塘，周长为 500 米，阿里及哈山同时同地背向而行，5 分钟相遇一次，如果同向而行，50 分钟相遇一次，阿里比哈山走得快，问：哈山每分钟走多少米？