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E Mathematics Olympiad System

## Malaysia International Mathematics Olympiad Competition 2016



Saturday 26<sup>th</sup> of November, 2016

9.30 am – 11.00 am

- Middle Primary Paper -

Jointly Organised by :

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

马来西亚数学奥林匹克学会  
黎明华文小学  
力行国民型华文学校  
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, full credit will be given only if ALL answers are correct, no partial credit will be given. 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.

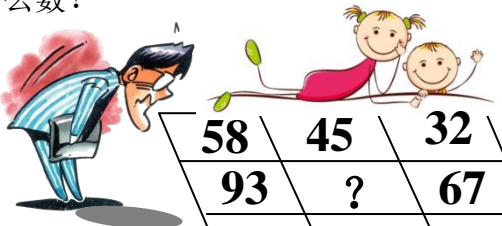
## Section A ( 4 marks each )

## A 组 (每题 4 分)

1.  $180 - 8 \times 5 = \star \times 3 + 89$ , Find  $\star = ?$   
 $180 - 8 \times 5 = \star \times 3 + 89$ , 求  $\star = ?$

2. What is the number should logically replace the question mark?

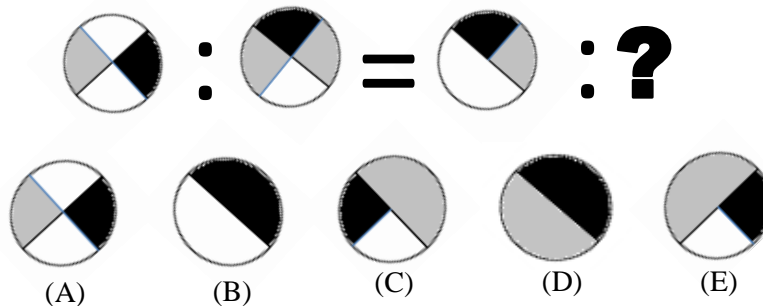
找规律，问号处应填什么数？



58	45	32
93	?	67
35	22	9

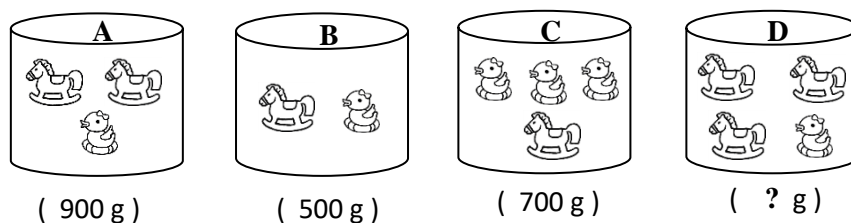
3. Which of the circles, A to E, should replace the question mark so that both lines – left and right – follow the same rule ?

观察等号左边与右边的图形关系，问号处的图形是 A~E 中的哪一个？



4. The figure shows the total weight of the toys in the box. Find the total weight of the Toys in box D.

下图为玩具盒里的玩具的总重量，求盒子 D 里的玩具总重量？



5. The difference between two numbers is 256. The larger number is 9 times the smaller number. What is the larger number ?

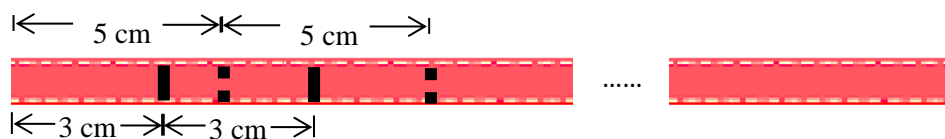
两数之差为 256。大数是小数的 9 倍，求大数是多少？

6. Bag A and Bag B originally has 54 and 63 balls respectively. If we want to make the number of balls in Bag A become 2 times the number of balls in Bag B, how many balls to be transferred from Bag B into Bag A ?

A 袋子和 B 袋子内原来分别放有 54 个和 63 个相同的小球，若要使 A 袋子内的小球的个数变为 B 袋子内小球的个数的两倍，那么应从 B 袋子内取出多少个小球放入 A 袋子？

7. A ribbon is 180 cm long. Symbols are marked from one end in every 3 cm and every 5 cm. Then this ribbon is cut at all these symbols. How many shorter ribbons can be obtained?

有一条彩带长 180cm,从一端开始每隔 3 cm 做一个记号，每隔 5 cm 也做一个记号，然后将所有标有记号的地方剪断。这条彩带共被剪成多少段？



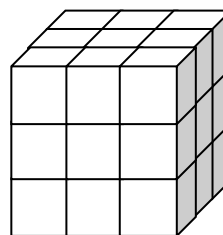
8. Doctor Brown prescribes Mary ten pills, one to be taken immediately, and the rest taken one at a time every 15 minutes after that. How long will it take for Mary to finish her pills?

布朗医生给玛丽十粒药丸，现在必须立即吃 1 粒，其余的药丸每 15 分钟吃一粒。

玛丽需要花多久时间吃完药丸？

9. Abdullah wishes to cut a cube with the size  $3 \times 3 \times 3$  into 27 small cubes, how many cuts he has to make to achieve that?

阿都拉要将一个  $3 \times 3 \times 3$  的大正方体切割成 27 个小正方体，他至少要切多少刀？



10. Compute :  $\frac{1}{2016} \times \left( \frac{3}{5} + \frac{6}{7} + \frac{5}{6} + \frac{7}{12} + \frac{9}{20} + \frac{11}{30} + \frac{13}{42} \right) = ?$

计算 :  $\frac{1}{2016} \times \left( \frac{3}{5} + \frac{6}{7} + \frac{5}{6} + \frac{7}{12} + \frac{9}{20} + \frac{11}{30} + \frac{13}{42} \right) = ?$

Section B ( 5 marks each )

B 组 (每题 5 分)

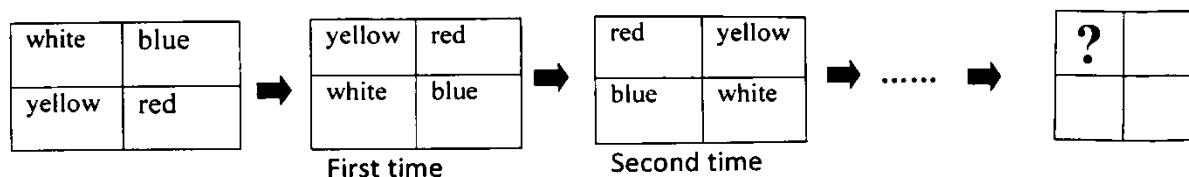
11. 5 years ago the brother's age was the same as the age of his sister 4 years later, the sum of his age 2 years later and his sister 8 years later is 97.

What is the age of the sister today?

哥哥 5 年前的年龄为妹妹 4 年后的年龄相等，哥哥 2 年后的年龄与妹妹 8 年后的年龄和为 97 岁，请问妹妹今年多少岁？

12. A lantern was formed by a combination of 4 light bulbs. Every 30 seconds, the color of the light bulbs will change once. For the first time, the colors of the bulbs will switch between the top and the bottom. For the second time, the bulbs will switch colors between the left and the right, continue by the sequence of top and bottom, then left and right, then again and again..... as shown in the figure below.

Following this sequence of color switch on the light bulbs, what will be the color of the light bulbs marked “?” in the rightmost figure below after 1 hour?



四盏灯组成彩灯，且每 30 秒钟灯的颜色变化一次，第一次上、下两灯互换颜色，第二次左、右两灯互换颜色，第三次又上、下两灯互换颜色，如下图，……，如此继续下去，开灯 1 小时后四盏灯的颜色排列情况。请问，最右边的空白方格内问号“?”处，应该是什么颜色的彩灯？



13. If  $1^2 = 1 \times 1$ ,  $2^2 = 2 \times 2$ , ...,  $25^2 = 25 \times 25$ , and  $1^2 + 2^2 + \dots + 25^2 = 5525$ , then find the value of  $3^2 + 6^2 + \dots + 75^2$ .

若是  $1^2 = 1 \times 1$ ,  $2^2 = 2 \times 2$ , ...,  $25^2 = 25 \times 25$ ,  $1^2 + 2^2 + \dots + 25^2 = 5525$ ,  
求  $3^2 + 6^2 + \dots + 75^2$  之值。

14.  $\overline{A4273B}$  is a 6-digit number in which A and B are unknown digits. This number is divisible by 72. Find A + B.

$\overline{A4273B}$  为一个六位数，A 和 B 是数码（数字）。此六位数能被 72 整除。求 A + B。

15. An adult movie ticket costs \$12.00. A child movie ticket costs \$7.00. Mr. Wong paid \$319.00 in all for 37 movie tickets. How many child movie tickets did he buy?

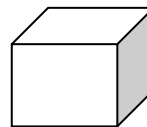
每张成人电影票售价\$12.00，儿童票\$7.00。王先生用\$319.00 一共买了 37 张。他买了多少张儿童票？

16. How many 3-digit prime numbers such that the sum of digits is 5?

数字和为 5 的三位数的质数有多少个？

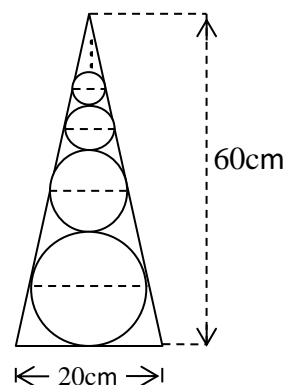
17. Mr. Addullah wants to colour every edge of a cube either yellow or blue. In order to have at least one yellow edge on every face of the cube, find the minimum number of edges that must be coloured yellow?

阿都拉先生要将一个正立方体的边涂上黄色或蓝色。立方体的每一个面至少要有一条边涂成黄色。那么被涂成黄色的边，至少有多少条？



18. As shown in the figure, find the sum of the diameters of the infinitely many circles drawn inside this triangle such that they do not overlap?

如图所示，三角形内有无限个圆相切，没有任何一个圆重叠，求所有的圆的直径的总和是多少？

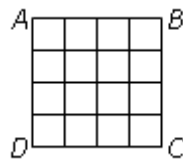


19. Old Mr. White left half his money to his granddaughter, and half that amount to his grandson. He left a sixth of his money to his brother, and remainder \$1000 to the dogs' home. How much did he leave altogether ?

老怀特先生将他的钱的一半分给他的孙女，分给孙子的钱是孙女的一半。他又将全部钱的六分之一留给了他的弟弟，最后剩下的\$1000 捐给宠物之家。那么怀特先生原来共有多少钱？

20. As shown in the figure, the square ABCD has a side length of 4 cm, and each side is divided into four equal parts. Find the sum of the perimeters of all the squares in the graph.

如图正方形 ABCD 的边长为 4cm, 每边被四等分. 求图中所有正方形周长的和.

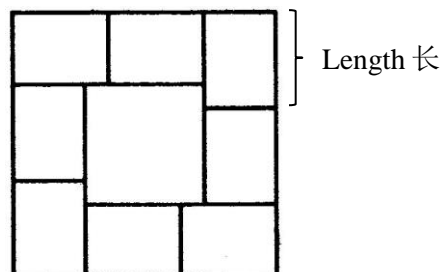


Section C ( 6 marks each )

C 组 (每题 6 分)

21. As shown below, Jim has made a square frame by 8 identical rectangular blocks. The perimeter of the large square frame is 320cm, and the area of the inner square is  $1024 \text{ cm}^2$ . Find the length of the rectangular block.

如图所示，吉米用 8 个相同的长方形组成一个大的正方形。大正方形的周长是 320 cm，中间的小正方形面积为  $1024 \text{ cm}^2$ ，求长方形的长。



22. Petaling Street in Kuala Lumpur, Malaysia, is a famous tourists' sightseeing and shopping place. If the first building from one side is numbered as 1, following the number sequence in ascending order till the end of the street, then continue the number labeling of the buildings to the next building opposite across the street. Continues the number labeling back to the end of the street on opposite's buildings. Assume that each building's location is exactly the opposite of the other building across the street. If building no.121 is located exactly opposite the building no. 294, how many buildings in total that Petaling Street has?

马来西亚吉隆坡有名的茨厂街，是游客们观光和购物的圣地。若是它的一边的大厦从 1 开始按顺序编号，直到街尾，然后从对面街上的大厦开始往回继续编号，到编号为 1 的大厦对面结束。每栋大厦与对面的大厦恰好相对。那么，编号为 121 的大厦在编号 294 的大厦对面，这条街两边共有多少栋大厦？



23. How many ways to choose 4 letters in the following phrase to get the word MIMO?  
(The order of the letters will not be changed)

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从下列文字中任意选出 4 个字母组成 MIMO，一共有多少种选法？（不可以改变字母原有的顺序）

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24. A natural number is going to add, subtract and divide itself to get the sum, the difference and the quotient respectively. The sum of these 3 resulting numbers is 2017. What is this natural number?

一个自然数与它本身相加、相减、相除所得的和、差、商再相加，结果是 2017。那么原来的自然数是多少？

25. Ali and May are running around an oval shaped track of 1200 m long. Ali's speed is 3m per second and May's speed is 4m per second. If they start from the same spot on the track but running opposite directions, then how far have they run when they meet in the starting point for the second time?

阿里和小梅沿着长 1200 米的椭圆形跑道跑步。阿里的速度是每秒 3 米，小梅的速度是每秒 4 米。他们同时同地背向而行，求当他们第二次在原来的出发点相遇时，一共跑了多远？



