Malaysia International Mathematics Olympiad Competition 2017

26 November, 2017
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

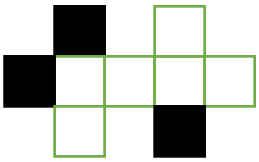
马来西亚数学奥林匹克学会
黎明华文小学
力行国民型华文学校
数学奥林匹克学研中心
联合主办

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.**

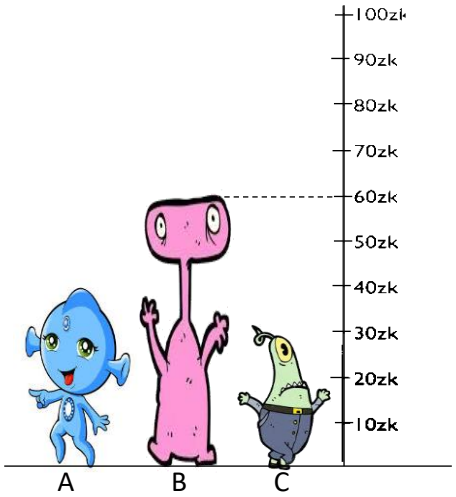
Section A (4 marks each)
A 组 (每题 4 分)

1. How many minimum squares must be shaded to make the given figure symmetric?
图中至少还需要多少个阴影的正方形，才能形成对称图形？

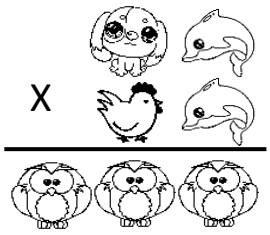


2. " zk" is the unit of height for aliens on a planet. The aliens will grow 10zk every month till 60zk, thereafter, the aliens will only grow 5zk in a month. Below are the heights of 3 aliens as of to date, who will has the height of 75zk in 6 months time ?

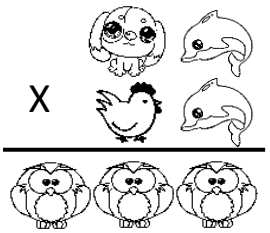
" zk" 是外星人量身高的单位，如果每个月长高 10 zk，到了 60 zk 高后，每个月只会长 5 zk。 下图表示目前它们的身高。那么哪一个外星人会在 6 个月后长高到 75 zk?



3. Every animal represents different single digit number in the mathematic operation as below (same animal will represent same single digit number). Find

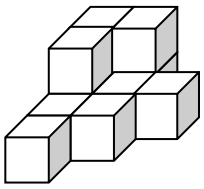


下面的乘法算式中，每种动物代表着不同的一位数（相同的动物代表相同的一位数），求



4. The solid below is made up of identical cubes of edge 2 cm. It is stuck firmly onto the ground with super glue. A coat of green paint is then applied onto the solid. What is the total area of the solid that is painted green ?

下图是由同样大小的小正方体堆积而成的，边长都是 2cm。底部用胶水紧贴于地面后，将它涂上绿色。被涂上绿色部分的面积是多少 cm^2 ？



5. Cut an 18-meter rope into three pieces so that the length of each piece is 3 meters longer than the previous piece. What is the length of the longest piece ?

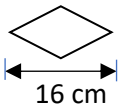
将一条 18 米长的绳子，分成三段，如果每一段都比前一段长 3 米，那么最长的一段绳子长多少米？

6. Mary's age is 3 years less than 4 times Tom's age, her age 3 years later will be Tom's age 9 years later. What is the age of Mary as of 2017?

玛丽的年龄比汤姆年龄的 4 倍少 3，玛丽 3 年后的年龄等于汤姆 9 年后的年龄。问：玛丽 2017 年是多少岁？

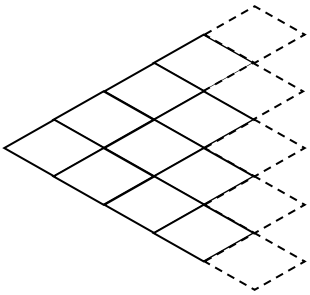
7. Form a bigger rhombus (pic 2) from the smaller rhombuses (pic 1). It is known that the diagonal length of the smaller rhombus is 16cm. How many smaller rhombuses are needed if the diagonal length of the bigger rhombus is 160cm?

将图（1）的小菱形，拼成图（2）的大菱形。已知小菱形对角线中长的对角线为 16 cm。当图（2）中的大菱形长的对角线为 160 cm 时，需要多少个图（1）的小菱形？



图（1）

(pic 1)

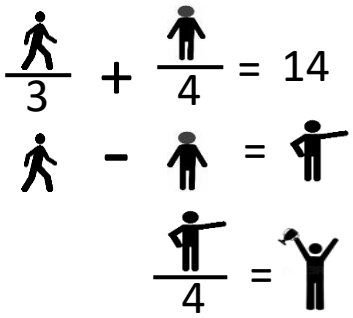


图（2）

(pic 2)

8. Every symbol represents a positive integer greater than 1. In order to fulfil the below mathematic operations, what number is representing?

每一种图案代表一个正整数，且都大于 1，同样的图案代表同样的数。满足下面的等式成立， 所代表的值应该是多少？



9. A, B, C and D are discussing their results after MIMO competition :

A : If I won the Gold medal, B also won the Gold medal.
B : If I won the Gold medal, C also won the Gold medal.
C : If I won the Gold medal, D also won the Gold medal.

All the three of them are telling the truth, but there are only 2 Gold medal winners. Who are the Gold medal winners ？

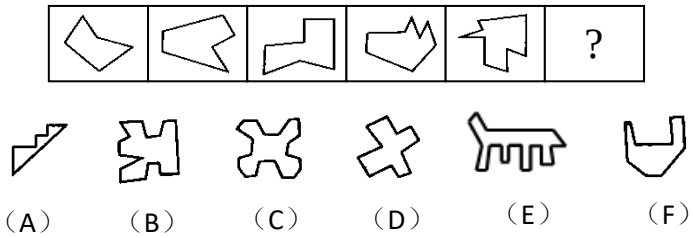
四位参加 MIMO 竞赛的学生 A、B、C 和 D，竞赛后谈论他们的成绩：

A 说：“ 如果我得金奖，那么 B 也得金奖。”
B 说：“ 如果我得金奖，那么 C 也得金奖。”
C 说：“ 如果我得金奖，那么 D 也得金奖。”

以上三位学生说的都是真话，但这四人当中却只有 2 位学生获得金奖。问：这四人中，谁获得金奖？

10. Which of the figures below best fits the series ?

问号处应该是 A、B、C、D、E、F 中的哪一个图形？

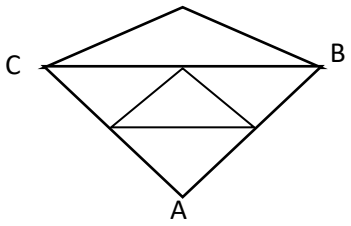


Section B (5 marks each)

B 组 (每题 5 分)

11. The graph below is part of a road map. There are two persons at point A and B respectively. They start their journey at the same moment, walking through all the road and finally reach point C. If both of them walk at the same speed, who will first arrive point C?

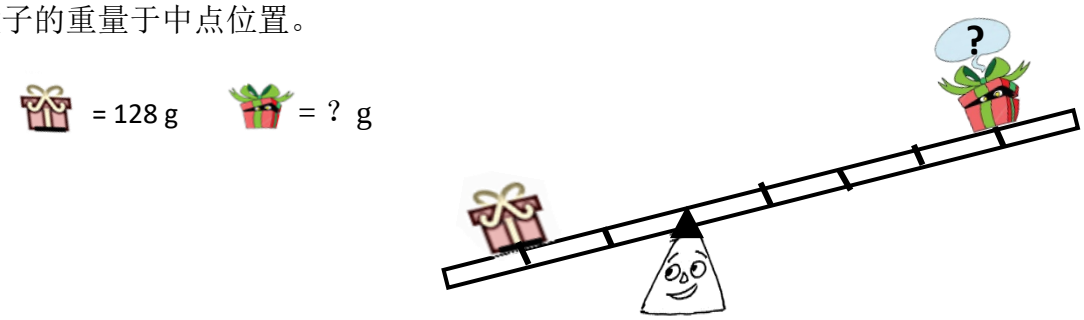
下图是公园的路线图。有两人同时以相同的速度自 A、B 两地出发，必须经过所有的路线到达 C 地。问从 A 地出发的人和从 B 地出发的人哪一个先到达？



（A）A　　（B）B　　（C）same time 同时抵达

12. What value needs to go into the upper box to bring this system into balance? Note: The lever is divided into equal parts and the weight of each box is taken from its midpoint.

如图所示，高处的盒子应重多少公克（g）杠杆才能保持平衡？注：杠杆被分为数段，每段长度都一样。视盒子的重量于中点位置。



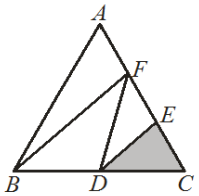
13. What number when you multiply it by 5 and add 6, then multiply that result by 4 and add 9, gives you a number that, when you multiply it by 5and subtract 165, gives you a number that, when you knock off the last 2 digits, brings you back to your original number?

将一数乘以 5 再加 6，再将答案乘以 4，再加 9 后，又将答案乘以 5 后减去 165，最后删去所得的答案的最后两位数，其结果等于原来的数，此数是多少？

(A) 1 （B）0 （C）100 (D) none（没有这样的数） (E) Any number（任何数都可以）

14. In the triangle ABC, D is the midpoint of BC, E & F equally divided AC. It is known that the area of ΔABC = 72cm^2. What is the area of ΔCDE ?

如图，在三角形 ABC 中，D 是 BC 的中点，E、F 是 AC 的三等分点。已知三角形 ABC 的面积是 72cm^2。三角形 CDE 的面积是多少 cm^2 ?



15. In how many ways can 15 books be allocated into 5 packets, with no empty packet ?

将 15 本不同的书分成五小包，没有任何一小包是空的，一共有多少种不同的分法？

16. A family love soft boiled eggs & hot soup. The father likes to eat 5 soft boiled eggs which boiled for seven minutes & hot soup boiled for three minutes; the mother likes to eat 3 soft boiled eggs which boiled for eight minutes & hot soup boiled for seven minutes; the son likes to eat 5 soft boiled eggs which boiled for ten minutes & hot soup

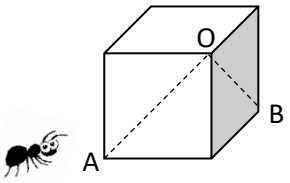
boiled for ten minutes; the daughter likes to eat 2 soft boiled eggs which boiled for 15 minutes & hot soup boiled for two minutes. If the family has only one big pot, what is the least time needed to make sure all the family members are able to enjoy their favourite food ?

有一个家庭，喜欢吃水煮蛋和热汤。爸爸喜欢吃 5 个煮 7 分钟的蛋和煮 3 分钟的汤。妈妈要吃 3 个煮 8 分钟的蛋和煮 7 分钟的汤。儿子要吃 5 个煮 10 分钟的蛋和煮 10 分钟的汤。而女儿要吃 2 个煮 15 分钟的蛋和煮 2 分钟的汤。假设这户人家只有一个大锅，要做完完全符合家人需要的食物，要花多久的时间？

17. We want to draw a number of straight lines such that for each square of a chessboard, at least one of the lines passes through an interior point of the square. What is the least number of lines needed for a 4 × 4 chessboard?
在每一个小方格都是正方形的棋盘上画若干条直线，我们必须至少画多少条直线以便所有 4 × 4 的小格都被直线穿过？

18. An ant crawls on a cube from A to B, Find the angle of AOB in degrees.

小蚂蚁从正方体盒子的 A 点爬到 B 点，所形成的角∠AOB 是多少度？



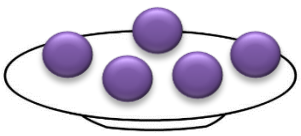
19. The 4th term of an arithmetic series is 33 and the sum of the 5th term and 8th term is 96. Find the 15th term of the series.
等差数列中的第四项是 33，第五项和第八项的和是 96， 求第 15 项。

20. Two players take turns taking marbles from the dishes according to the rules below. In order to win the game, how many marbles should a player take on the first turn? And from which dish ？

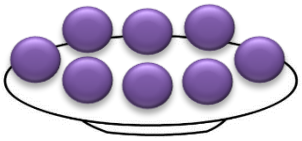
1. Two players take turns taking one, two or three marbles from one dish per turn.
2. The player who takes the last marble wins.

根据下面的规则，两人轮流从盘子中取出弹珠。 为了赢得比赛，首先应该从哪一个盘子拿出多少个弹珠？

1.两人轮流从其中一个盘子里拿走一个、两个或三个弹珠。
2.最后一个弹珠的玩家获胜。



（A）



（B）

Section C (6 marks each)
C 组 (每题 6 分)

21. A van left Town E at 11:00 am and travelled towards Town F. Two hours later, a car left Town E for Town F and travelled along the same route. The car passed the van at 4:00 pm. The average speed of the car was 40 km/h faster than the van. Find the average speed of the van.

一辆客货车于上午 11:00 从 E 城市开出前往 F 城市，两小时后，一辆轿车沿着同一路线同向开出。下午 4:00 时，轿车恰好超过客货车。已知轿车的速度比客货车的速度快 40 km/h。求客货车的速度。

22. Twenty mathematics-training team members of grade four in Lai Meng School have finished working out 2017 problems in a 3-day special training period. Each student has completed different number of problems and the student who has done the most problems finished 114. What is the minimum number of problems which the student who has finished the fewest problems has completed?

黎明学校四年级数学竞赛集训队 20 名学员在三天的专题训练中，总共做题 2017 个，每位学员做题数都不相同，其中做题最多的学员完成了 114 个题，那么做题最少的学员至少做题多少？

23. Tom and Mike were fishing. Tom got 4 fish and Mike got 3 fish. John came. Three of them ate the 7 fish. To be fair, John paid $201.60 for the shared portion. How much should Mike share the $201.60?

汤姆和麦克两人钓鱼，汤姆钓了 4 条，麦克钓了 3 条，正准备吃的时候，约翰过来加入吃鱼，吃完鱼后，为了公平，约翰拿出$201.60，那么,麦克应该分到多少钱？

24. There are four alphabet decorative lights, MIMO, each being programmed to light once every 3, 4, 5, 6 minutes respectively. If the teacher switch on the power at 9:00am & off the power at 6.30pm, how many times will the four decorative lights be lit simultaneously ?

四盏 MIMO 字母的装饰灯各别已设定每 3，4，5，6 分钟亮一次。若老师在早上 9 点正开启电源，直到傍晚 6 点 30 分才关电，四盏 MIMO 字母灯会一起亮（同一个时间 4 盏灯都亮着）多少次？

25. Digits 2,0,1 and 7 are to replace the four letters in the below mathematics operation :

$\overline{BAD}+\overline{MAD}+\overline{DAM}$

What is the maximum sum one could possible get?

在加法算式 $\overline{BAD}+\overline{MAD}+\overline{DAM}$ 中，用 2、0、1、7 这四个数字代替四个字母，（要求不同的字母用不同的数字，相同的字母用相同的数字）那么所得的最大和是多少？

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