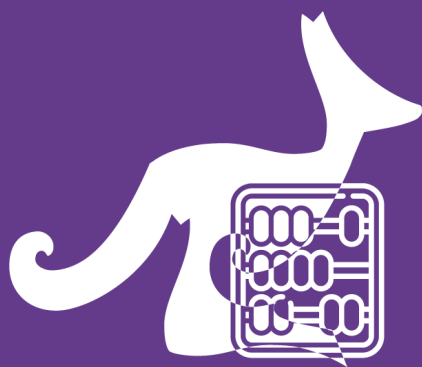




MATH KANGAROO CHINA

考试说明 / Instruction

Time allowed: 75 minutes

考试时长: 75 分钟

Language: English & Chinese

试卷语言: 英文和中文

This is a 30-question multiple-choice competition.

考试包含 30 道单项选择题。

Problems 1 to 10 are worth 3 points each.

1-10 题每题 3 分

Problems 11 to 20 are worth 4 points each.

11-20 题每题 4 分

Problems 21 to 30 are worth 5 points each.

21-30 题每题 5 分

1 point will be deducted for an incorrect answer and no point for a blank answer.

答错扣 1 分, 不答不扣分。

The full score is 150 (Starting point is 30)

总分为 150 分 (起始分数为 30 分)

Do not open this booklet until you are told to do so.

收到监考老师指令后, 方可打开试卷册。

Mark your answers clearly on the answer sheet using a

2B pencil.

务必使用 **2B 铅笔** 在答题卡上正确填涂自己的答案。

Calculator cannot be used during the competition.

考试期间禁止使用计算器。

Good Luck!

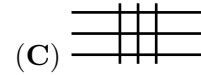
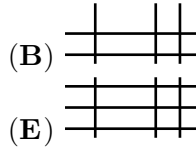
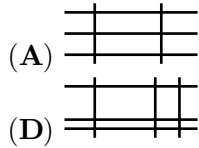
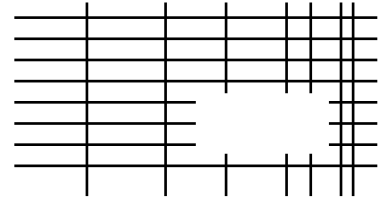
预祝考试顺利

**Grade 7
&
Grade 8**

3 points

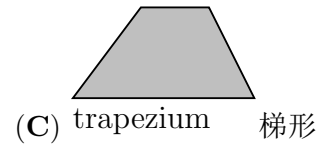
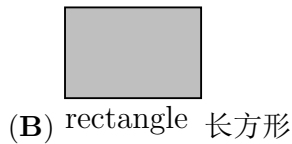
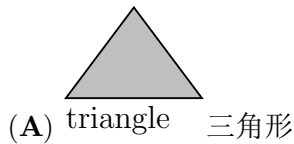
1. The diagram shows a set of horizontal and vertical lines with one part removed. Which of the following could be the missing part?

右图显示了一组水平线和垂直线，其中有一部分缺失了。以下哪一项可能是缺失部分？



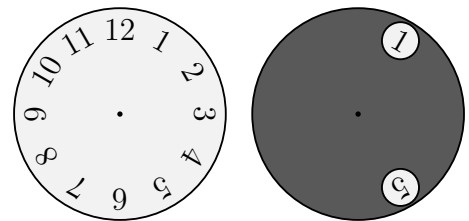
2. Which of the shapes below cannot be divided into two trapezia by a single straight line?

以下哪种形状不能用一条直线分成两个梯形？



3. A grey circle with two holes in it is placed on top of a clock-face, as shown. The grey circle is turned around its centre such that an 8 appears in one hole. Which two numbers could be seen in the other hole?

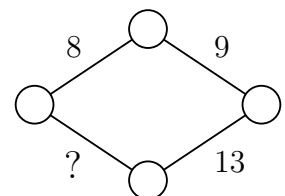
如图所示，将带有两个孔的灰色圆盘放在钟面上。灰色圆盘绕其中心旋转，一个孔中出现数字 8。哪两个数字可能会在另一个孔中出现？



- (A) 4 or 12 4 或 12 (B) 1 or 5 1 或 5 (C) 1 or 4 1 或 4
- (D) 7 or 11 7 或 11 (E) 5 or 12 5 或 12

4. Werner wants to write a number at each vertex and on each edge of the rhombus shown. He wants the sum of the numbers at the two vertices at the ends of each edge to be equal to the number written on the edge. What number will he write instead of the question mark?

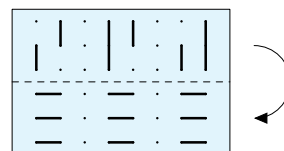
Werner 希望在右图菱形的每个顶点和每条边上都写上数字，使得每条边两个端点上的数字之和等于这条边上的数字。他会在问号处写下哪个数字？



- (A) 11 (B) 12 (C) 13 (D) 14 (E) 15

5. Kristina has a piece of transparent paper with some lines marked on it. She folds it along the dashed line. What can she now see?

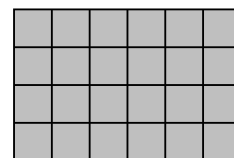
Kristina 有一张透明纸，上面画有一些线，她沿着虚线将纸对折。此时她能看见什么图案？



- (A) (B) (C) (D) (E)

6. A tiler wants to tile a floor of dimensions $4\text{ m} \times 6\text{ m}$ using identical tiles. No overlaps or gaps are allowed. Which of the following tiles could not be used?

瓷砖工想用完全相同的瓷砖铺满 $4\text{ m} \times 6\text{ m}$ 的地板，瓷砖不可以重叠或有间隙。请问不能使用以下哪种瓷砖？



- (A) (B) (C) (D) (E)

7. John has 150 coins. When he throws them on the table, 40% of them show heads and 60% of them show tails. How many coins showing tails does he need to turn over to have the same number show heads as show tails?

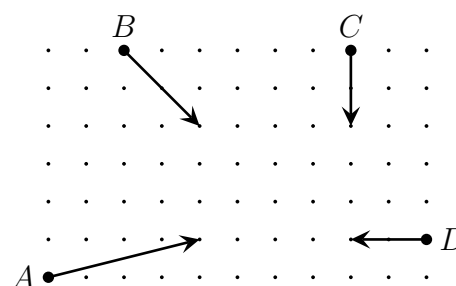
John 有 150 枚硬币。当他将所有硬币抛掷在桌子上时，40% 的硬币正面朝上，60% 的硬币背面朝上。他需要翻转多少枚背面朝上的硬币，才能使得正面和背面朝上的硬币数量相同？

- (A) 10 (B) 15 (C) 20 (D) 25 (E) 30

8. The diagram shows the initial position, the direction of travel and how far four bumper cars move in five seconds.

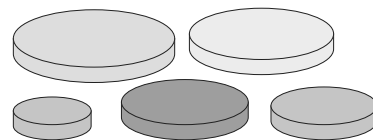
Which two cars will collide?

右图显示了四辆碰碰车的初始位置、行驶方向以及在五秒内能移动的距离。哪两辆车会相撞？



- (A) A and B A 和 B (B) A and C A 和 C
(C) A and D A 和 D (D) B and C B 和 C
(E) C and D C 和 D

9. Anna has five circular discs, each of a different size. She decides to build a tower using three of her discs so that each disc in her tower is smaller than the disc below it. How many different towers could Anna construct?



Anna 有五个大小不同的圆盘，她想用其中三个圆盘建造一个塔，并且每个圆盘都比紧邻它下方的圆盘小。Anna 可以建造多少个不同的塔？

- (A) 5 (B) 6 (C) 8 (D) 10 (E) 15

10. Evita wants to write the numbers 1 to 8 in the boxes of the grid shown, so that the sums of the numbers in the boxes in each row are equal and the sums of the numbers in the boxes in each column are equal. She has already written numbers 3, 4 and 8, as shown. What number will she write in the shaded box?

	4		
3		8	

Evita 希望将数字 1 到 8 填入右图方格中，使得方格中每一行的数字之和相等，每一列的数字之和相等。如图所示，她已经填入了数字 3、4 和 8。她会在阴影方格中填入哪个数字？

- (A) 1 (B) 2 (C) 5 (D) 6 (E) 7

4 points

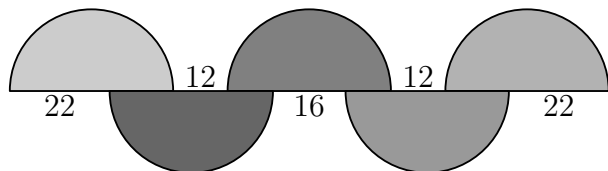
11. Theodorika wrote down three consecutive whole numbers in order, but instead of digits she used symbols so wrote $\square\Diamond\Diamond$, $\heartsuit\triangle\triangle$, $\heartsuit\triangle\square$.

What would she write next?

Theodorika 按顺序写下三个连续的整数，但是她用符号代替了数字： $\square\Diamond\Diamond$, $\heartsuit\triangle\triangle$, $\heartsuit\triangle\square$ 。请问下一个数字是什么？

- (A) $\heartsuit\heartsuit\Diamond$ (B) $\square\heartsuit\square$ (C) $\heartsuit\triangle\Diamond$ (D) $\heartsuit\Diamond\square$ (E) $\heartsuit\triangle\heartsuit$.

12. The diagram shows five equal semicircles and the lengths of some line segments. What is the radius of the semicircles?



- (A) 12 (B) 16 (C) 18 (D) 22 (E) 36

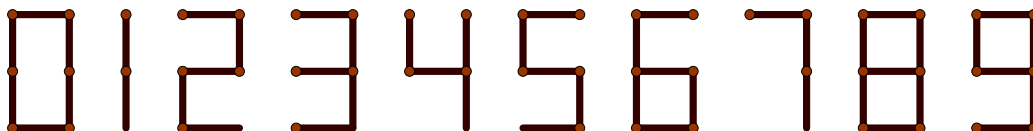
13. Some edges of a cube are to be coloured red so that every face of the cube has at least one red edge. What is the smallest possible number of edges that could be coloured red?

要将立方体的一些边涂成红色，使得每个面都至少有一条红色的边。请问最少可能有多少条边需要涂成红色？

- (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

14. Matchsticks can be used to write digits, as shown in the diagram.

火柴棍可以拼出如图所示的数字。



How many different positive integers can be written using exactly six matchsticks in this way?

按照这种方式，恰好使用六根火柴棍可以组成多少个不同的正整数？

- (A) 2 (B) 4 (C) 6 (D) 8 (E) 9

15. The edges of a square are 1 cm long. How many points on the plane are exactly 1 cm away from two of the vertices of this square?

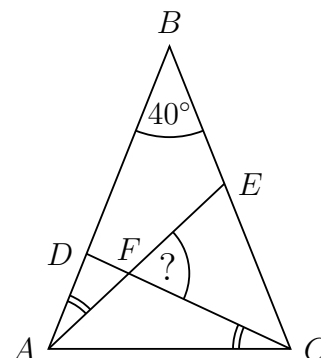
一个正方形的边长为 1 厘米。平面上有多少个点距离这个正方形的两个顶点都恰好为 1 厘米？

- (A) 4 (B) 6 (C) 8 (D) 10 (E) 12

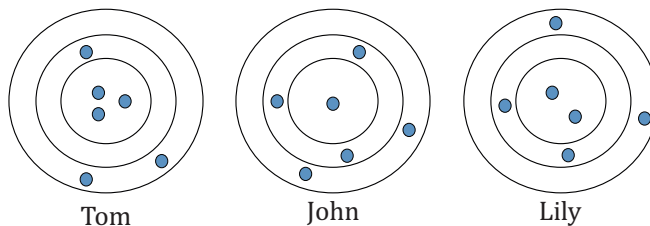
16. Triangle ABC is isosceles with $\angle ABC = 40^\circ$. The two marked angles, $\angle EAB$ and $\angle DCA$, are equal. What is the size of the angle $\angle CFE$?

等腰三角形 ABC 中， $\angle ABC = 40^\circ$ 。标记的两个角 $\angle EAB$ 和 $\angle DCA$ 度数相等。 $\angle CFE$ 的大小是多少？

- (A) 55°
(B) 60°
(C) 65°
(D) 70°
(E) 75°



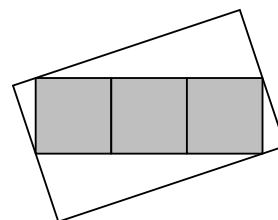
17. Tom, John and Lily each shot six arrows at a target. Arrows hitting anywhere within the same ring score the same number of points. Tom scored 46 points and John scored 34 points, as shown. How many points did Lily score?



Tom、John 和 Lily 各自击中靶子六次，击中同一环内任何位置的得分均相同。如图所示，Tom 获得 46 分，John 获得 34 分。Lily 获得了多少分？

- (A) 37 (B) 38 (C) 39 (D) 40 (E) 41

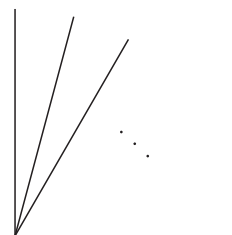
18. The diagram shows a rectangle made from three grey squares, each of area 25 cm^2 , inside a larger white rectangle. Two of the vertices of the grey rectangle touch the mid-points of the shorter sides of the white rectangle and the other two vertices of the grey rectangle touch the other two sides of the white rectangle. What is the area, in cm^2 , of the white rectangle?



右图表示一个大的白色长方形内包含着一个由三个灰色正方形组成的长方形，每个正方形的面积为 25 平方厘米。灰色长方形的其中两个顶点分别与白色长方形的短边中点重合，另外两个顶点位于白色长方形的长边上。白色长方形的面积是多少平方厘米？

- (A) 125 (B) 136 (C) 149 (D) 150 (E) 172

19. Angelo drew two lines meeting at a right-angle. What is the smallest number of extra lines he could draw inside his right-angle, as shown, so that for any of the values 10° , 20° , 30° , 40° , 50° , 60° , 70° and 80° , a pair of lines can be chosen with the angle between them equal to that value?



Angelo 绘制了两条相交成直角的线。如图所示，他最少需要在直角内绘制多少条直线，使得度数为 10° 、 20° 、 30° 、 40° 、 50° 、 60° 、 70° 和 80° 的角都可以从其中两条直线的夹角中找到？

- (A) 2 (B) 3 (C) 4
(D) 5 (E) 6

20. The sum of 2023 consecutive integers is 2023. What is the sum of digits of the largest of these integers?

2023 个连续整数之和等于 2023。其中最大的整数的各个数位上的数字之和是多少？

- (A) 4 (B) 5 (C) 6 (D) 7 (E) 8

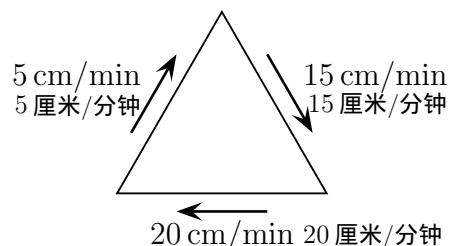
5 points

21. Some beavers and some kangaroos are standing in a circle. There are three beavers in total and there are no two beavers who are standing next to another beaver. There are exactly three kangaroos who are standing next to another kangaroo. What is the largest possible amount of kangaroos in the circle?

一些海狸和袋鼠站成一个圆圈。一共有三只海狸，任意两只海狸旁边站着的都不是海狸，恰好只有三只袋鼠旁边站着的也是袋鼠。这个圆圈中最多有多少只袋鼠？

- (A) 4 (B) 5 (C) 6 (D) 7 (E) 8

22. An ant is walking along the sides of an equilateral triangle. The speeds at which it travels along the three sides are 5 cm/min, 15 cm/min and 20 cm/min, as shown. What is the average speed, in cm/min, at which the ant walks the whole perimeter of the triangle?



一只蚂蚁沿着等边三角形的边爬行。如图所示，它沿三条边行进的速度分别为 5 厘米/分钟、15 厘米/分钟和 20 厘米/分钟。蚂蚁在三角形整个周长上爬行的平均速度是多少（以厘米/分钟为单位）？

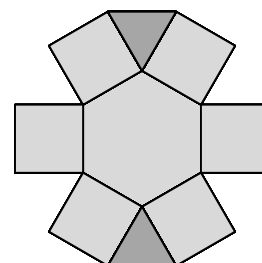
- (A) 10 (B) $\frac{80}{11}$ (C) $\frac{180}{19}$ (D) 15 (E) $\frac{40}{3}$

23. Snow White organised a chess competition for the seven dwarves, in which each dwarf played one game with every other dwarf. On Monday, Grumpy played 1 game, Sneezy played 2, Sleepy 3, Bashful 4, Happy 5 and Doc played 6 games. How many games did Dopey play on Monday?

白雪公主为七个小矮人组织了一场象棋比赛，每个小矮人都要与其他所有小矮人比赛一局。周一这天，Grumpy 参加了 1 场比赛，Sneezy 参加了 2 场，Sleepy 参加了 3 场，Bashful 参加了 4 场，Happy 参加了 5 场，Doc 参加了 6 场。Dopey 周一参加了多少场比赛？

- (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

24. Elizabetta wants to write the numbers 1 to 9 in the regions of the shape shown so that the product of the numbers in any two adjacent regions is not more than 15. Two regions are said to be adjacent if they have a common edge. In how many ways can she do this?



Elizabetta 想在右图的各个部分中写上数字 1 至 9，使得任意两个相邻部分中的数字之积不超过 15。如果两个部分有公共边，则称之为相邻。请问她一共有多少种填写方式？

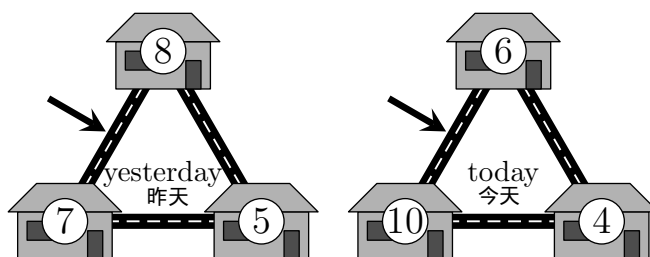
- (A) 12 (B) 8 (C) 32
(D) 24 (E) 16

25. Martin is standing in a queue. The number of people in the queue is a multiple of 3. He notices that he has as many people in front of him as behind him. He sees two friends, both standing behind him in the queue, one in 19th place and the other in 28th place. In which position in the queue is Martin?

Martin 正在排队。排队的总人数是 3 的倍数，他注意到他前面的人数和后面的人数相同，有两个朋友都排在他后面的队伍中，一个排在第 19 位，另一个排在第 28 位。Martin 排在队伍的第几位？

- (A) 14 (B) 15 (C) 16 (D) 17 (E) 18

26. Some mice live in three neighbouring houses. Last night, every mouse left its house and moved to one or the other of the other two houses, always taking the shortest route. The numbers in the diagram show the number of mice per house, yesterday and today. How many mice used the path shown by the arrow?



一些老鼠住在三间相邻的房子里。昨晚，每只老鼠都离开自己的房子，选择最短的路径搬到另外两所房子中的一所。图中的数字表示昨天和今天每个房子里的老鼠数量。有多少只老鼠选择了箭头所指的路径？

- (A) 9 (B) 11 (C) 12 (D) 16 (E) 19

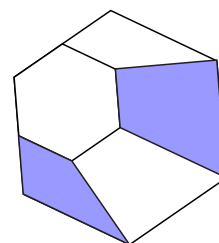
27. Bart wrote the number 1015 as a sum of numbers using only the digit 7. He used a 7 a total of 10 times, as shown. Now he wants to write the number 2023 as a sum of numbers using only the digit 7, using a 7 a total of 19 times. How many times will he use the number 77?

$$\begin{array}{r} 777 \\ 77 \\ + 77 \\ 77 \\ 7 \\ \hline 1015 \end{array}$$

Bart 将 1015 写成几个只由数字 7 组成的数之和。如图所示，他一共使用了 10 次 7。现在，他想使用 19 次 7 把 2023 也写成几个只由数字 7 组成的数之和，他会用到多少次 77？

- (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

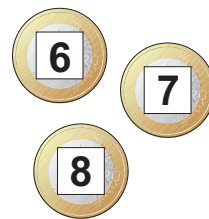
28. A regular hexagon is divided in four quadrilaterals and one smaller regular hexagon. The area of the shaded region and the area of the small hexagon are in the ratio $\frac{4}{3}$. What is the ratio $\frac{\text{area small hexagon}}{\text{area big hexagon}}$?



一个正六边形被分成四个四边形和一个较小的正六边形。阴影部分面积与小六边形的面积之比为 $\frac{4}{3}$ 。请问 $\frac{\text{小六边形的面积}}{\text{大六边形的面积}}$ 的值是多少？

- (A) $\frac{3}{11}$ (B) $\frac{1}{3}$ (C) $\frac{2}{3}$ (D) $\frac{3}{4}$ (E) $\frac{3}{5}$

29. Jake wrote six consecutive numbers onto six white pieces of paper, one number on each piece. He stuck these bits of paper onto the top and bottom of three coins. Then he tossed these three coins three times. On the first toss, he saw the numbers 6, 7 and 8, as shown, and then coloured them red. On the second toss, the sum of the numbers he saw was 23 and on the third toss the sum was 17. What was the sum of the numbers on the remaining three white pieces of paper?



Jake 在六张白纸上写下六个连续数字，每张纸上写一个数字。他将这些纸片粘在三枚硬币的正反面，然后将三枚硬币抛掷三次。第一次抛掷后，他看到数字 6、7 和 8，如图所示，然后将它们涂成红色；第二次抛掷后，他看到的数字之和是 23；第三次抛掷后，他看到的数字之和是 17。请问剩下的三张白纸上的数字之和是多少？

- (A) 18 (B) 19 (C) 23 (D) 24 (E) 30

30. A rugby team scored 24 points, 17 points and 25 points in the seventh, eighth and ninth games of the 2022 season. Their average points-per-game was higher after 9 games than it was after their first 6 games. Their average after 10 games was more than 22. What is the smallest number of points that they could have scored in their 10th game?

一支橄榄球队在 2022 赛季的第七场、第八场和第九场比赛中分别获得 24 分、17 分和 25 分。他们在第九场比赛后的平均每场得分比第六场比赛后的平均每场得分更高。第十场比赛后，他们的平均每场得分超过了 22 分。他们在第 10 场比赛中可能得到的最低分数是多少？

- (A) 22 (B) 23 (C) 24 (D) 25 (E) 26