

2025

AUSTRALIAN MATHEMATICS COMPETITION

AMC.

AMT.
AUSTRALIAN
MATHS TRUST

Junior
Years 7–8

Information 考試說明

- There are 30 questions: 25 multiple-choice and 5 integer.
本次考試共 30 題，包含 25 題單選題和 5 題答案為整數 000~999 的選填題。
- You are allowed 75 minutes to do the questions.
考試時長為 **75 分鐘**。
- There are no penalties for incorrect answers.
答錯不扣分。
- The questions have been checked thoroughly. Each question is clearly written and no further explanation will be given.
本次考試的所有試題已仔細檢查。每題均清楚陳述，不會提供更多解釋。
- Diagrams are not drawn to scale. They are intended only as aids.
圖形並非按比例繪製，僅供參考。

Competition rules 考試規則

- Do not open the paper until told to do so.
收到監考老師指示前，請勿翻開試卷。
- Mobile phones and smart watches are not allowed.
禁止使用手機和智慧型手錶。
- You may not use calculators.
不允許使用計算機。

No student may sit the competition more than once or sit more than one division of the competition. AMT conducts integrity checks on competition results and reserves the right to withhold results or disqualify students if plagiarism or duplicate sittings are suspected.

IMPORTANT

All papers must be immediately returned to a supervisor at the end of the competition.
This paper is not for circulation or distribution until Monday 29 September 2025.

DATE

5 August

TIME ALLOWED

75 minutes

TURN THE BOOKLET
OVER AND READ THE
INSTRUCTIONS ON THE
BACK COVER.

Junior Division
Questions 1 to 10, 3 marks each
1-10 題，每題 3 分

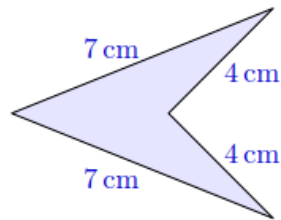
1. What is $20 \times 2 + 5$?

請問 $20 \times 2 + 5$ 的值是多少?

- (A) 27 (B) 45 (C) 50 (D) 140 (E) 200

2. What is the perimeter of this dart?

請問這個飛鏢的周長是多少?



- (A) 18cm (B) 19cm (C) 20cm (D) 21cm (E) 22cm

3. A speaker's volume dial is shown.

Which of the following is the best estimate of the current volume setting?

揚聲器的音量調節旋轉鈕如圖所示，請問以下哪個選項最接近所指音量設定的估計值?

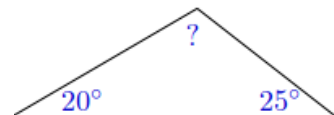
- (A) 5.6 (B) 6.7 (C) 7.1 (D) 7.9 (E) 8.3



4. What is the value of the missing angle in the diagram?

請問圖中問號的角度值是多少?

- (A) 45° (B) 75° (C) 105° (D) 135° (E) 165°

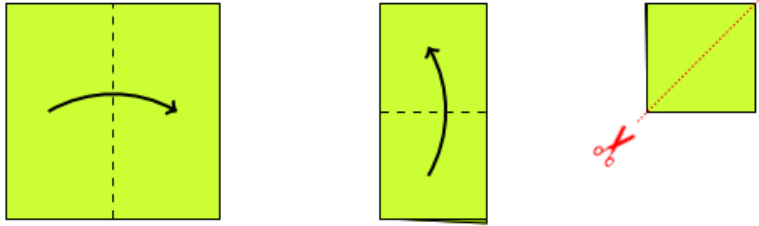


5. Apple cost \$3 each. One apple and two bananas cost \$7. What is the cost of one banana?
蘋果每個售價為 3 美元。一個蘋果和兩根香蕉的售價為 7 美元。請問一根香蕉的售價是多少?

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

6. A paper square is to be folded twice and then cut along the dotted line as shown. After this, how many pieces of paper are there?

如圖所示，將一張正方形紙片對折兩次後沿虛線剪開。完成上述步驟後，請問這張紙片會被分成多少個部分？

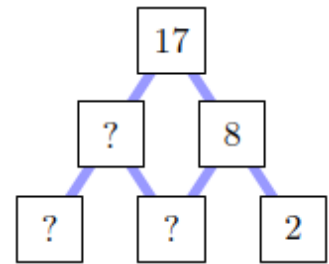


- (A) 2 (B) 4 (C) 8 (D) 12 (E) 16

7. In this number puzzle, two adjacent numbers in the same row should add to the number written above them.

What is the sum of the three unknown numbers marked with question marks?

在數字謎題中，同一列相鄰兩數之和等於其上方的數。請問標記問號處的三個未知數之和是多少？



- (A) 16 (B) 17 (C) 18 (D) 19 (E) 20

8. What is the obtuse angle between the hands of a clock at 5pm?

請問下午5點時，時鐘的時針與分針所夾的鈍角是多少度？

- (A) 30° (B) 90° (C) 120° (D) 135° (E) 150°

9. The number 20.25 expressed as a fraction is

請問小數 20.25 可表示為下列哪一個分數？

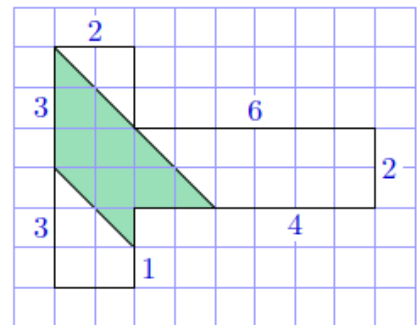
- (A) $\frac{41}{2}$ (B) $\frac{61}{3}$ (C) $\frac{81}{4}$ (D) $\frac{101}{5}$ (E) $\frac{121}{6}$

10. A T puzzle is made up of four pieces, shown here on a grid of 1 cm squares. What is the area of the shaded piece, in square centimetres?

如圖所示，在一個由邊長為1公分的方格組成的網格上有一個由四塊拼圖碎片組成的T型拼圖。

請問陰影部分的面積是多少平方公分？

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



Questions 11 to 20, 4 marks each

11-20 題，每題 4 分

11. In the fraction $\frac{11}{\triangle}$, which positive integer should replace the triangle to make the fraction as close to 3 as possible?

請問在分數 $\frac{11}{\triangle}$ 中，用哪個正整數替換其中的三角形，能使該分數最接近 3？

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

12. Timmy has a bag with 9 balls in it, numbered 1 to 9. He pulls one ball out at random and looks at the number. Which of the following is the most likely to occur?

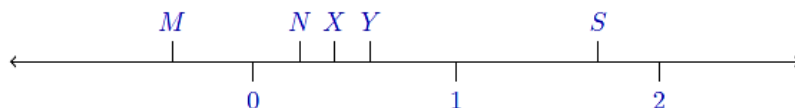
提米的袋中有 9 顆球，編號從 1 至 9。他從中隨意取出一顆球並查看上面的數字。請問以下哪種情況最有可能發生？

- (A) The number is odd. 該數字是奇數
 (B) The number is even. 該數字是偶數
 (C) The number is less than 4. 該數字小於 4
 (D) The number is more than 5. 該數字大於 5
 (E) The number is a multiple of 3. 該數字是 3 的倍數

13. The fractions represented by the points X and Y are multiplied.

What point on the number line best represents their product?

將數線上點 X 和 Y 所表示的分數相乘。請問數線上的哪個點最能表示其乘積？

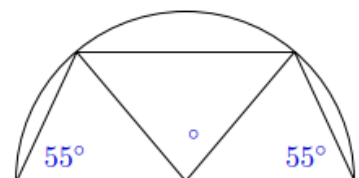


- (A) M (B) N (C) X (D) Y (E) S

14. In this diagram, P is the centre of the diameter of the semicircle. What is the value of x ?

如圖所示， P 是該半圓直徑的中點。請問 x 的值是多少？

- (A) 40 (B) 45 (C) 50 (D) 55 (E) 60



15. In early August, I have 13000 litres of water stored in this tank. I use 80 litres per day and don't refill it. When will it run out?
八月初，該水箱儲水量為13000公升，若每日消耗80公升且不進行補充。請問水箱中的水何時會用盡？



- (A) early September 九月初
(B) late October 十月末
(C) early December 十二月初
(D) mid January 一月中旬
(E) late February 二月末

16. Nathan wrote down the list formed by repeating the digits of 2025:
納森寫下了一個由2025的數字循環組成的數列：

2, 0, 2, 5, 2, 0, 2, 5, 2, 0, 2, 5, ...

He stopped when the total of all the numbers in his list reached 2025. How many numbers are in his list?

當數列中所有數字相加的總和達到2025時，他停止書寫。請問這個數列中共有多少個數字？

- (A) 225 (B) 500 (C) 825 (D) 900 (E) 1000

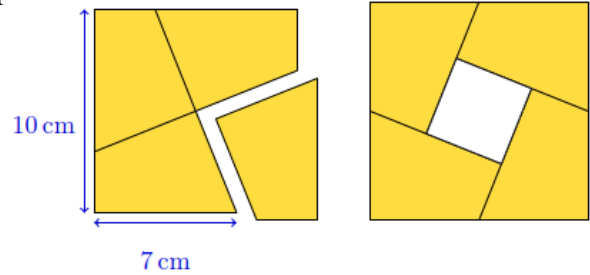
17. Alice and Bob are standing in a queue, with Alice somewhere in front of Bob. In the queue, there are 17 people behind Alice, 23 people in front of Bob, and 8 people between them. How many people are in the queue?

甲乙兩人排在隊伍中，甲排在乙前面。隊伍中甲後面有17人，乙前面有23人，他們之間有8人。請問該隊伍中共有多少人？

- (A) 30 (B) 31 (C) 32 (D) 33 (E) 34

18. A $10\text{cm} \times 10\text{cm}$ square is cut into four identical pieces, as shown on the left. The pieces are rearranged to form a larger square with a square hole in the middle.

一個 10 公分 (cm) \times 10 公分 (cm) 的正方形被分割成四個相同的區塊 (如左圖所示), 重新排列這些區塊後, 形成一個中間有正方形孔洞的大正方形。



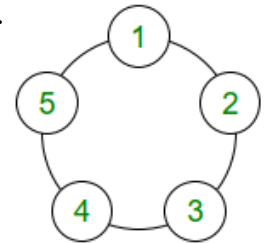
What, in square centimetres, is the area of the hole?
請問, 這個正方形孔洞的面積是多少平方公分?

- (A) 4 (B) 8 (C) 10 (D) 12 (E) 16

19. Starting at one of these digits, then moving all the way around the circle in either direction, a 5-digit number can be read off. For instance 34512 and 43215 are 2 of the 10 possibilities. When all 10 of these numbers are added, the result is a six-digit number.

What is the largest digit of this number?

如圖所示, 從圖中任意一個數字出發, 按順時針或逆時針方向繞一圈, 可以讀出一個 5 位數。這樣的 5 位數一共有 10 個, 例如, 34512 和 43215 就是其中的 2 個。當將這 10 個所有可能的 5 位數相加時, 結果是一個六位數。



請問這個六位數中最大的數字是多少?

- (A) 1 (B) 3 (C) 5 (D) 7 (E) 9

20. Kerri can walk the 9km around the block at a steady rate in 1 hour and 45 minutes. She can run around the same block in 36 minutes. If Kerri walks for the first 3km and runs for the rest, how long will it take for her to get around the block?

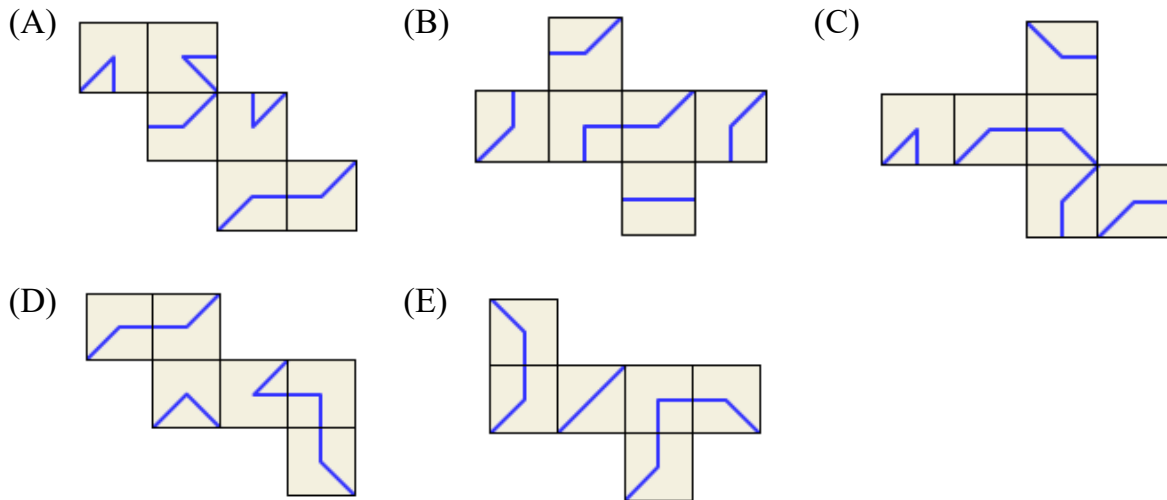
凱莉能以固定的速度走完一圈 9 公里的街區, 用時 1 小時 45 分鐘。她跑步繞行同一個街區, 用時 36 分鐘。如果凱莉先步行 3 公里, 剩餘的路程跑步完成, 請問她繞行整個街區需要多少時間?

- (A) 58min 58 分鐘 (B) 59min 59 分鐘
(C) 60min 60 分鐘 (D) 61min 61 分鐘
(E) 62min 62 分鐘

Questions 21 to 25, 5 marks each
21-25 題，每題 5 分

21. Max has drawn a *simple closed curve* on the surface of a cube: his pen traces a continuous path that ends up back where it started, without retracing or lifting off the cube. Which diagram could be a net for the cube?

麥克斯在一個立方體表面畫了一條簡單封閉曲線：他的筆沿著一條連續路徑移動，最終回到起點，且在移動過程中沒有折回或離開立方體表面。請問以下哪個立方體的展開圖可能對應此立方體？



22. My local hardware shop has screws in packs of 500, 200 and 50 screws. I manage to buy the number of screws I need for no more than \$100.

What is the most screws I could have bought?

本地五金店出售螺絲，包裝規格分別為每包500個、每包200個以及每包50個，每包價格如表所示。

我計劃以不超過100美元的價格買到所需數量的螺絲。

請問下列哪個答案符合**不超過**100美元而能買到最多數量的螺絲？

- (A)1000 (B)1100 (C)1200 (D)1300 (E)1350

<i>Screws in pack</i>	<i>Price</i>
螺絲包裝規格	價格(美元)
500	\$36
200	\$16
50	\$10

23. A mini cross number puzzle is shown. No answer starts with 0.
 一個迷你縱橫填數字謎題如圖所示。所有答案均不以 0 開頭。

Across 橫向提示

1. A perfect cube
 三位數是一個完全立方數
4. An odd square number
 三位數是一個奇數的平方數

Down 縱向提示

1. A number whose prime factors each have a single digit
 二位數是一個所有質因數均為一位數的整數
2. A power of 2
 三位數是一個 2 的冪次方數
3. A multiple of 5
 二位數是一個 5 的倍數

1	2	3
4 ?		

Which digit goes in the highlighted cell?
 請問，有問號的格子中應該填入哪個數字？
 (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

24. Tilly has a number of identically sized red, green and blue square tiles. She wishes to make a pattern on her wall using four of these tiles in a 2-by-2 grid. However, she doesn't want any two tiles that share a common edge to be the same colour. In how many ways can she make this pattern?

緹莉有若干大小相同的紅色、綠色和藍色方形瓷磚。她想用四塊這樣的瓷磚在牆上拼出一個 2×2 的圖案，但要求任意兩塊共邊的相鄰瓷磚顏色都不相同。請問她可以拼出多少種不同的圖案？



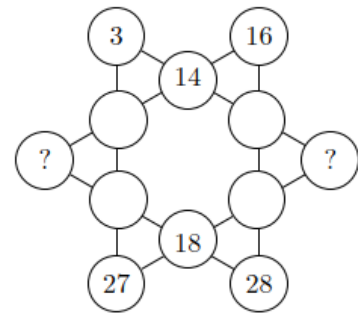
- (A) 6 (B) 9 (C) 12 (D) 18 (E) 24

25. Arwen writes a number in each empty circle so that every straight line of four numbers adds to 60.

When the puzzle is complete, what is the sum of the two numbers in the leftmost and rightmost circles?

阿文在每個空白圓圈中填入一個數，使得每條直線上的四個數之和均為60。完成謎題後，請問最左端和最右端圓圈中的兩數之和是多少？

- (A) 28 (B) 29 (C) 30 (D) 31 (E) 32



For questions 26 to 30, shade the answer as a whole number from 0 to 999 in the space provided on the answer sheet.

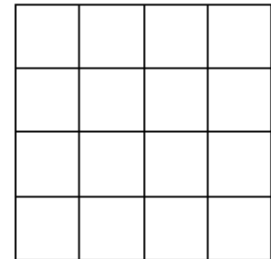
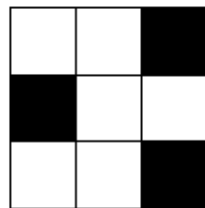
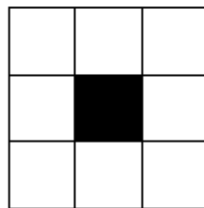
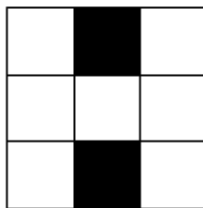
問題 26-30 的答案為 0-999 之間的整數，請將答案填塗在答題卡對應區域。

Questions 26-30 are worth 6, 7, 8, 9 and 10 marks, respectively.

第 26-30 題分別為 6, 7, 8, 9, 10 分。

26. A grid is called *sparse* if in each 2-by-2 block, exactly 1 square is black and the rest are white. Three examples of sparse 3-by-3 grids are shown on the left :

若一個網格內的每個 2×2 的區塊中都恰好有1個黑色方格，其餘均為白色方格，則稱此網格為稀疏網格。下圖左側展示了三個 3×3 稀疏網格範例：



Counting rotations and reflections as different, how many ways are there of filling the 4-by-4 grid to make a sparse grid?

若將旋轉和鏡射後重疊都視為不同的情況下，請問有多少種塗黑方式可使得一個 4×4 的網格成為一個稀疏網格？

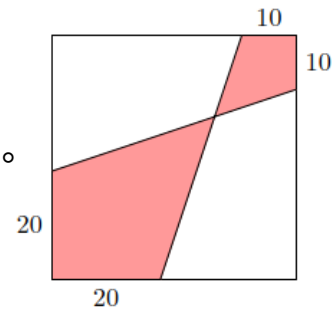
27. Shaun constructed a large cube using small cubes of size $1 \times 1 \times 1$. Two small cubes are called *neighbouring* if they share a common face. So each small cube has at most six neighbouring cubes. It is known that 132 small cubes have exactly four neighbouring cubes each. How many small cubes have exactly five neighbouring cubes?

阿杉用若干個 $1 \times 1 \times 1$ 的小立方體搭建一個大立方體。如果兩個小立方體共用一個公共面，則稱它們為相鄰立方體。因此，每個小立方體最多有六個相鄰小立方體。已知有132個小立方體恰好每個都有四個相鄰小立方體。請問有多少個小立方體恰好有五個相鄰的小立方體？

28. This square has sides of length 45 centimetres and an area of 2025 square centimetres.

What is the shaded area, in square centimetres?

已知右圖正方形的邊長為 45 公分，面積為 2025 平方公分。
請問圖中陰影部分的面積為多少平方公分？



29. Madeleine thinks of four whole numbers. She writes down all six possible sums of two of the numbers on a piece of paper. Sebastien can read the numbers 71, 89, 77, 80 and 59 on this piece of paper, but cannot read the sixth sum. What is the sixth sum that Madeleine wrote?

小馬選了四個整數，並將所有 6 種可能的兩數之和寫在紙上。小斯可以看到紙上的數是：71、89、77、80 和 59，但第六個和數看不清。請問小馬寫的第六個和數是多少？

30. Martin made a mosaic with 2025 square tiles arranged in a 45-by-45 grid.

The mosaic is a blue-and-white checkerboard of differently shaped rectangles. The top-left corner is shown here, including 25 rectangles.

The first row of rectangles is one tile high, the second two tiles high, the third three tiles high, and so on.

The first column of rectangles is one tile wide, the second two tiles wide, the third three tiles wide, and so on. The bottom-right rectangle is a **9-by-9 square**.

馬丁用 2025 塊正方形瓷磚拼成一個 45×45 的網格狀馬賽克圖案。這幅馬賽克是一個藍白相間的棋盤格圖案，由不同形狀的矩形組成。左上角的部分如圖所示，包含 25 個矩形。

第一列矩形的高都是 1 塊瓷磚，第二列的高都是 2 塊瓷磚，第三列的高都是 3 塊瓷磚.....以此類推。

第一行矩形的寬都是 1 塊瓷磚，第二行的寬都是 2 塊瓷磚，第三行的寬都是 3 塊瓷磚.....以此類推。右下角的矩形是一個 9×9 的正方形。

Every blue rectangle has a 1-wide border of dark blue tiles, and the interior is composed of light blue tiles.

又每個藍色矩形都有 1 塊瓷磚的深藍色邊框，且內部由淺藍色瓷磚組成。

How many of the 2025 tiles in the mosaic are dark blue?

這種 2025 塊瓷磚拼成的馬賽克圖案中，請問有多少塊瓷磚是深藍色的？

