

2025

# AUSTRALIAN MATHEMATICS COMPETITION

# AMC.

**AMT.**  
AUSTRALIAN  
MATHS TRUST

Intermediate  
Years 9–10

## 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**

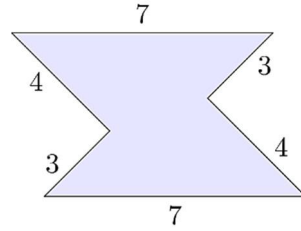
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TURN THE BOOKLET  
OVER AND READ THE  
INSTRUCTIONS ON THE  
BACK COVER.

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

1. What is the perimeter of this hexagon?

請問這個六邊形的周長是多少？

- (A) 28 (B) 31 (C) 34 (D) 37 (E) 40



2. 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的音量設定的估計值？

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



3. One-third of a number is 24. What is double the number?

一個數的三分之一是 24。請問這個數的兩倍是多少？

- (A) 12 (B) 16 (C) 36 (D) 72 (E) 144

4. Apples 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

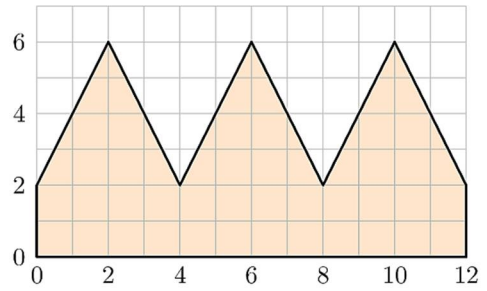
5. What is the value of  $\frac{2025}{20+25} + \frac{2025}{2+0+2+5}$ ?

請問  $\frac{2025}{20+25} + \frac{2025}{2+0+2+5}$  的值是多少？

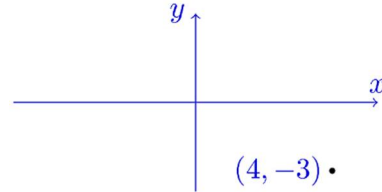
- (A) 270 (B) 450 (C) 720 (D) 810 (E) 2025

6. What is the shaded area, in square units?  
 請問陰影部分的面積是多少平方單位？

(A) 24 (B) 36 (C) 48 (D) 60 (E) 72



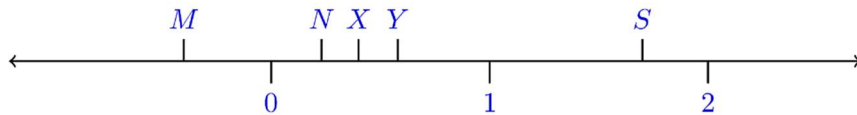
7. The point  $(4, -3)$  is reflected in the  $x$ -axis.  
 What are the coordinates of the resulting point?  
 請問點  $(4, -3)$  關於  $x$  軸對稱後的坐標是什麼？
- (A)  $(-3, 4)$  (B)  $(3, -4)$  (C)  $(-4, -3)$   
 (D)  $(-4, 3)$  (E)  $(4, 3)$



8. Allendale Square is a 132-metre tall building in Perth. A stairwell runs from the ground floor to the roof.  
 If the height of each step is 20 cm, approximately how many steps are in the stairwell?  
 位於珀斯 (Perth) 的艾倫代爾廣場 (Allendale Square) 是一座高 132 公尺的大樓。大樓內有一座樓梯，從地面層直通頂層。  
 如果每級臺階的高度是 20 公分，請問該座樓梯大約有多少級臺階？
- (A) 66 (B) 132 (C) 660 (D) 730 (E) 1320



9. 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？

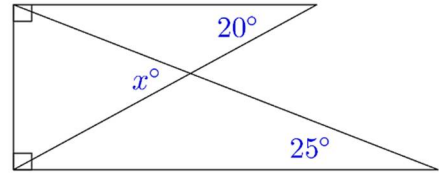


(A)  $M$  (B)  $N$  (C)  $X$  (D)  $Y$  (E)  $S$

10. What is the value of  $x$  in the diagram?

請問圖中  $x$  的值是多少？

- (A) 35 (B) 45 (C) 55 (D) 65 (E) 75



Questions 11 to 20, 4 marks each

11-20 題，每題 4 分

11. A regular hexagon and an equilateral triangle have the same perimeter. The ratio of the area of the hexagon to that of the triangle is

一個正六邊形和一個正三角形的周長相同。請問該六邊形面積與該三角形的面積之比是多少？

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

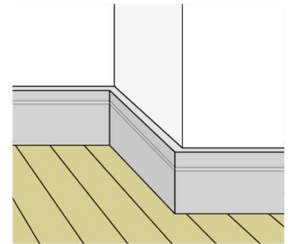
12. Pat has installed 150 metres of skirting board in a house. The board is 120 millimetres tall and 20 millimetres thick, and will be painted on the front face and top. The paint covers 14 square metres per litre.

帕特在房子裡安裝了 150 公尺的踢腳板。踢腳板高 120 毫米，厚 20 毫米，需要在正面和頂部刷漆。每公升油漆可刷 14 平方公尺。

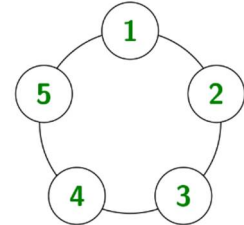
Which one of the following purchases of paint will give Pat enough paint and have the least left over?

請問以下哪種油漆購買方案能滿足帕特的需求，並且剩餘量最少？

- (A) One 1L can      一罐 1 公升裝  
 (B) One 2L can      一罐 2 公升裝  
 (C) One 4L can      一罐 4 公升裝  
 (D) Two 4L cans     兩罐 4 公升裝  
 (E) One 15L can     一罐 15 公升裝



13. 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，可以讀出一個五位數。這樣的五位數一共有10個，例如，34512和43215就是其中的2個。當將這10個所有可能的五位數相加時，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

14. Kerri can walk the 9 km 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 3 km and runs for the rest, how long will it take for her to get around the block?

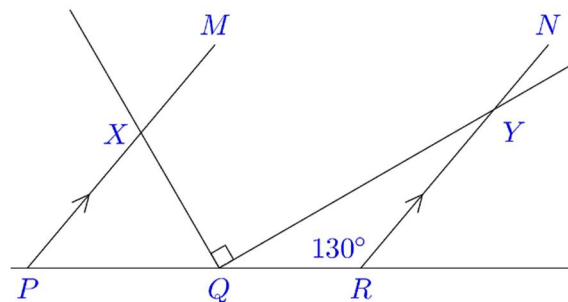
凱莉能以固定的速度走完一圈9公里的街區，用時1小時45分鐘。她跑步繞行同一個街區，用時36分鐘。如果凱莉先步行3公里，剩餘的路程跑步完成，請問她繞行整個街區需要多少時間？

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

15. In the diagram,  $PM$  is parallel to  $RN$ ,  $\angle XQY = 90^\circ$  and  $\angle QRY = 130^\circ$ . What is the value of  $\angle MXQ + \angle QYN$ ?

如圖所示， $\overline{PM}$  平行於  $\overline{RN}$ ， $\angle XQY = 90^\circ$ ， $\angle QRY = 130^\circ$ 。請問  $\angle MXQ + \angle QYN$  是多少度？

- (A)180° (B)210° (C)260° (D)270° (E)350°



16. A sportswear brand designed this new logo.

某運動服裝品牌設計了一款新標誌。

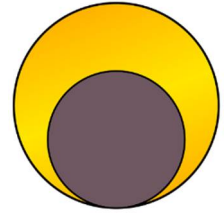
The smaller circle has regular paint and the crescent between the two circles has metallic paint. The radius of the larger circle is 1.5 times the radius of the smaller circle.

較小的圓使用普通塗料，兩圓之間的月牙形區域使用金屬塗料。  
大圓半徑是小圓半徑的1.5倍。

What is the ratio of regular paint to metallic paint in their logo?

請問在這款標誌中，普通塗料與金屬塗料的比例是多少？

- (A) 1 : 1    (B) 1 : 2    (C) 1 : 3    (D) 4 : 5    (E) 5 : 8



17. Juan drew a quadrilateral on the number plane by plotting these points:

胡安在坐標平面上繪製了一個四邊形，其頂點為：

$$P(1, 1) \quad Q(4, 1) \quad R(7, 11) \quad \text{and} \quad S(1, 4)$$

$$P(1, 1) \quad Q(4, 1) \quad R(7, 11) \quad \text{和} \quad S(1, 4)$$

What is the area of  $PQRS$ , in square units?

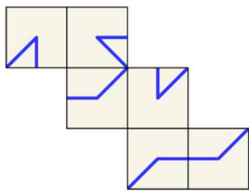
請問四邊形  $PQRS$  的面積是多少平方單位？

- (A) 21    (B) 24    (C) 28    (D) 30    (E) 36

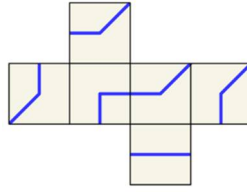
18. Max has drawn a *simple closed curve* on the surface of a cube: his pen traces a continuous path that ends up back where it started, without retracing or lifting off the cube. Which diagram could be a net for the cube?

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？

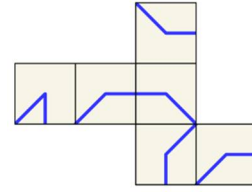
(A)



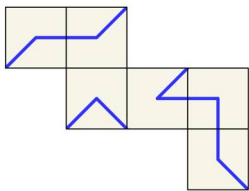
(B)



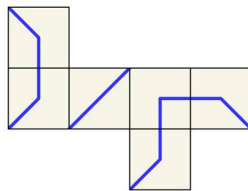
(C)



(D)



(E)



19. Positive integers  $a$  and  $b$  satisfy the following equation:  
正整數  $a$  和  $b$  滿足以下方程式：

$$\frac{a-8}{b} = \frac{a-1}{b+7}$$

What is the largest possible value that  $\frac{a}{b}$  can take?

請問  $\frac{a}{b}$  的最大可能值是多少？

- (A)6 (B)7 (C)8 (D)9 (E)10

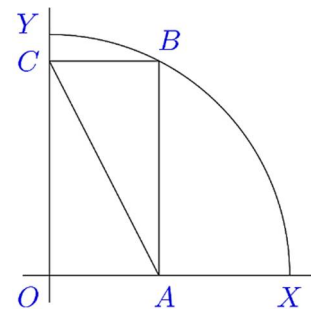
20. Three solutions  $A$ ,  $B$  and  $C$  contain salt and sugar. The concentrations of each are given in the table. They are mixed together in the ratio  $a : b : c$  to produce a liquid with a salt concentration of 10% and also a sugar concentration of 10%. Find the mixing ratio  $a : b : c$ .

	Solution 溶液		
	$A$	$B$	$C$
Salt 鹽	15%	8%	10%
Sugar 糖	10%	13%	5%

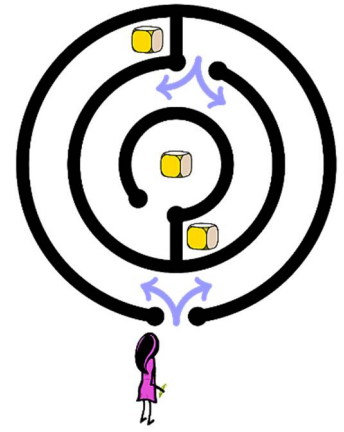
三種溶液  $A$ 、 $B$  和  $C$  中含有鹽和糖，其濃度如右表所示。將它們按  $a : b : c$  的比例混合，得到一種鹽濃度為 10% 且糖濃度也為 10% 的液體。請計算混合比例  $a : b : c$ 。  
(A)1 : 3 : 2 (B)2 : 7 : 1 (C)3 : 5 : 4 (D)2 : 5 : 3 (E)3 : 4 : 3

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

21. A rectangle  $OABC$  is inscribed in a quadrant of a circle as shown.  $OA = 8$  cm and  $AX = 9$  cm. The length  $AC + CY$ , in centimetres, is  
如圖所示，一個長方形  $OABC$  內接於一個四分之一圓中。 $\overline{OA} = 8$  公分且  $\overline{AX} = 9$  公分。請問  $\overline{AC} + \overline{CY}$  等於多少公分？  
(A)16 (B)17 (C)18 (D)19 (E)20



22. This maze contains three gold prizes. Mei enters through the door at the bottom, carrying a cob of corn. When she has a choice of two directions, she tosses a coin to choose left or right. She keeps going until she can go no further, and picks up the prize there, puts the corn at this place and leaves.



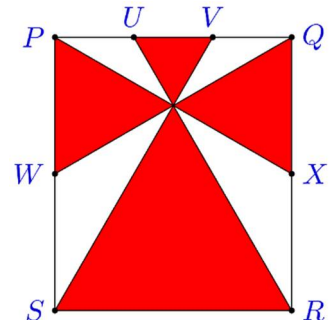
這個迷宮中有三個黃金寶藏。小玫帶著一根玉米從底部的入口進入。當有兩個方向可選時，她通過拋硬幣來決定向左或向右。她會一直走到無法繼續前進，然後拿走該處的獎品，放下玉米後離開。

Theo then enters the maze and chooses his path using the same method, until he gets his prize—either gold or corn. What is the probability that his prize is one of the gold prizes?

西奧隨後進入迷宮，用同樣的方法選擇路徑，直到拿到獎品—黃金寶藏或玉米。請問他獲得一個黃金寶藏的機率是多少？

- (A)  $\frac{1}{3}$    (B)  $\frac{2}{3}$    (C)  $\frac{1}{4}$    (D)  $\frac{5}{6}$    (E)  $\frac{5}{8}$

23. In the rectangle  $PQRS$  shown, the lines  $UR$ ,  $SV$ ,  $WQ$  and  $PX$  meet at a common point. The four shaded triangles are equilateral.



What fraction of the rectangle  $PQRS$  is shaded?

如圖所示，在長方形  $PQRS$  中，直線  $\overline{UR}$ 、 $\overline{SV}$ 、 $\overline{WQ}$  和  $\overline{PX}$  相交於同一點。四個陰影三角形均為正三角形。

請問陰影部分占長方形  $PQRS$  的比例是多少？

- (A)  $\frac{2}{3}$    (B)  $\frac{5}{6}$    (C)  $\frac{1}{2}$    (D)  $\frac{7}{12}$    (E)  $\frac{11}{24}$

24. Mark writes four positive integers around a circle in yellow. Then on the arc between every two neighbouring yellow numbers he writes their product in blue. The sum of the four blue numbers is 2507. What is the sum of the four yellow numbers?

馬克用黃色筆在圓周上寫下四個正整數。然後在每兩個相鄰黃色數目之間的弧上用藍色筆寫下它們的乘積。四個藍色數目之和為 2507。請問四個黃色數目之和是多少？

- (A) 132   (B) 184   (C) 256   (D) 328   (E) 384

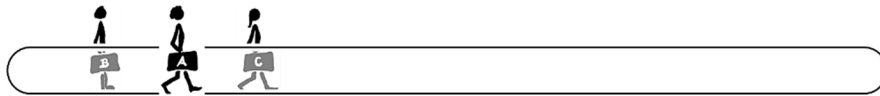
25. Amy, Bruce and Colleen are walking together through an airport, all at the same speed. They reach a moving walkway that is 42 metres long.

小愛、布魯斯和柯琳一起以相同的速度步行穿過機場。他們走到一條長42公尺的自動人行道前。

- Amy doesn't use the walkway, but just walks alongside without changing speed.  
小愛沒有使用自動人行道，而是以原速度步行。

- Bruce steps onto the walkway and stands still, arriving at the end 7 seconds after Amy.  
布魯斯踏上自動人行道後靜止不動，比小愛晚7秒到達終點。

- Colleen steps onto the walkway and keeps walking without changing her walking speed, and reaches the end 9 seconds before Amy.  
柯琳踏上自動人行道後依舊保持原速度步行，比小愛早9秒到達終點。



Let the times they each spend travelling this 42 metres be  $a$ ,  $b$  and  $c$  seconds, respectively.

What is  $a + b + c$ ?

設他們走完這42公尺的時間分別為 $a$ 、 $b$ 和 $c$ 秒。請問 $a + b + c$ 是多少？

(A)60 (B)61 (C)62 (D)63 (E)64

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.

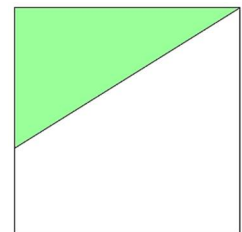
第 26-30 題分別為 6, 7, 8, 9, 10 分。

26. This square has sides of length 45, and area 2025.

The triangle's perimeter is 70% of the square's perimeter.

What is the area of the triangle?

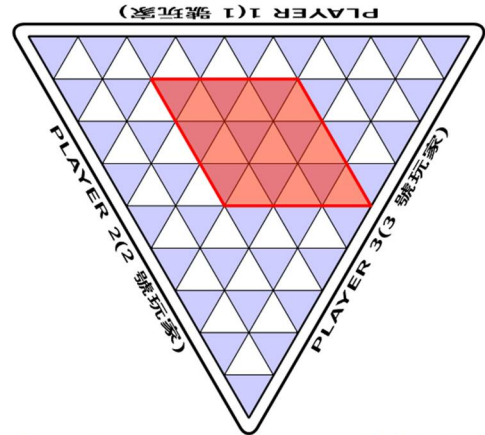
如圖所示，正方形邊長為45，面積為2025。三角形的周長是正方形周長的70%。請問三角形的面積是多少？



27. 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？

28. In the game of *Rhombus Blockade*, players place rhombuses of any size within this triangular board so that their edges line up with the triangular grid. For the opening move, the first player places a single rhombus of any size on the board. For example, the diagram shows an opening move where the player has chosen and placed a rhombus with sides of length 3.



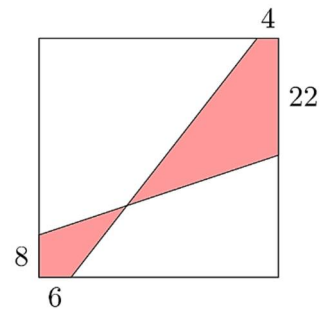
How many possible opening moves are there?

在遊戲“菱形迷陣”中，玩家需將任意大小的菱形放置在三角形棋盤內，使其邊與三角形網格的邊對齊。開局時，先手玩家需在棋盤內放置一個任意尺寸的菱形。例如，圖中玩家選擇放置了一個邊長為3的菱形作為開局。請問，有多少種可能的開局方式？

29. This square has sides of length 45 and area 2025.

What is the shaded area?

這個正方形的邊長為45，面積為2025。請問陰影部分的面積是多少？



30. A  $4 \times 4$  grid of unit squares is drawn on a whiteboard, then some squares are shaded black so that no two black squares share a vertex.

How many ways are there to complete such a shading?

在白板上繪製一個 $4 \times 4$ 的單位正方形網格，然後將若干小正方形塗黑，使得任意兩個黑色小正方形不得共用一個頂點。請問有多少種滿足上述要求的塗法？