

2024-2025 中三
下學期統測一
數學

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數學

試題答題簿

本試卷中文試題必須用中文作答

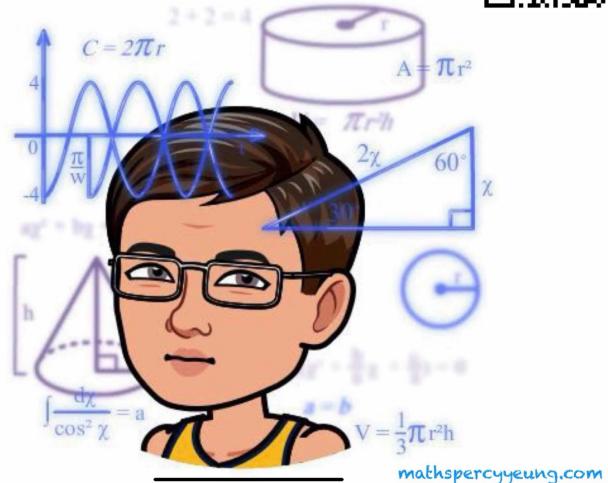
英文試題必須用英文作答

二零二五年三月二十四日
一小時完卷

(上午八時十五分至上午九時十五分)

考生須知

- (一) 宣布開考後，考生須首先在第 1 頁的適當位置填寫學生姓名、班別及學號。
- (二) 本試卷各題均須作答，答案須寫在本試題答題簿中預留空位內。
- (三) 除特別指明外，須詳細列出所有算式。數值答案須用真確值，或準確至三位有效數字的近似值表示。
- (四) 本試卷的附圖不一定依比例繪成。



部 份	分 數
甲 (1-2)	
甲 (3-10)	
甲部	/50
乙部	/20
全卷	/70

甲部 (50 分)

1. 解聯立方程 $\begin{cases} 3x - 5y = 27 \\ 3x + 2y = 6 \end{cases}$ 。 (3分)

2. 在圖 1， ΔABD 和 ΔBCD 都是直角三角形。 $AB = 5$ ， $AD = 3$ 及 $BC = 1$ 。求 CD 。

(如有需要, 答案以根式表示。) (3分)

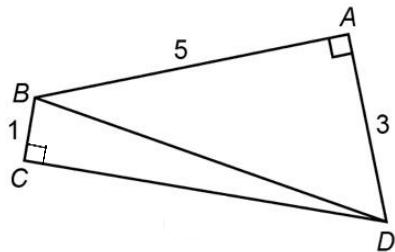


圖 1

3. (a) 因式分解

$$(i) \quad 6a^2 - 5ab - 6b^2 \quad ,$$

$$(ii) \quad 12a^2 + 11ab + 2b^2 \quad \circ$$

(b) 由此, 因式分解 $(6a^3 - 5a^2b - 6ab^2) + (24a^2b + 22ab^2 + 4b^3)$ 。

(5分)

4. (a) 化簡 $(-2x^4y^{-3})^{-2} \times (x^{-1}y^{-2})^{-3}$ 並以正指數表示答案。

(b) 若 n 為一正整數，化簡 $\frac{3^{n+3} \times 9^{n+1}}{9^{3n+4}}$ 。

(6分)

5. Figure 2 shows a right frustum.

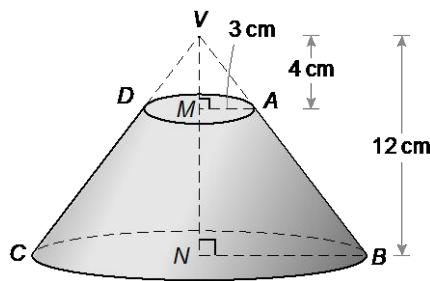


Figure 2

- (a) Find the base radius NB .
 - (b) Find the volume of the frustum.
 - (c) Find the total surface area of the frustum.

(Express your answers in terms of π if necessary.)

(7 marks)

6. In Figure 3, a sector is rolled up to form a right circular cone of height 30 cm and volume 2560π cm 3 .

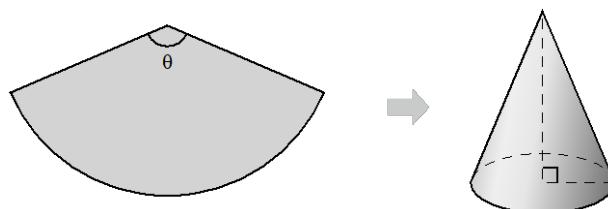


Figure 3

- (a) Find the base radius of the circular cone.
 - (b) Find the curved surface area of the circular cone in terms of π .
 - (c) Aiden claims that θ is greater than 170° . Do you agree? Explain your answer.

(7 marks)

7. In Figure 4, D is a point lying on AB and CD is the height of $\triangle ABC$. Find the value of k .

(3 marks)

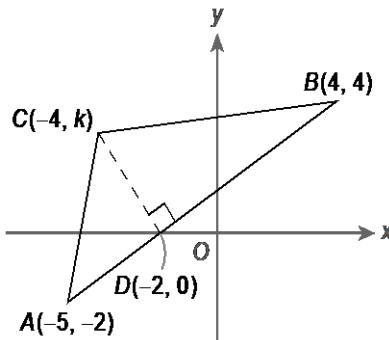


Figure 4

8. Three points $A(-12, 5)$, $B(k-1, k)$ and $C(4, -11)$ are collinear.

(a) Find the value of k .

(b) Romeo claims that $AB : AC = 1 : 3$. Do you agree? Explain your answer.

(6 marks)

9. 在圖 5, ABC 和 AED 是直線。 $\angle BAC = 30^\circ$, $DE = 3\text{ cm}$ 及 $CD = 3\sqrt{3}\text{ cm}$ 。

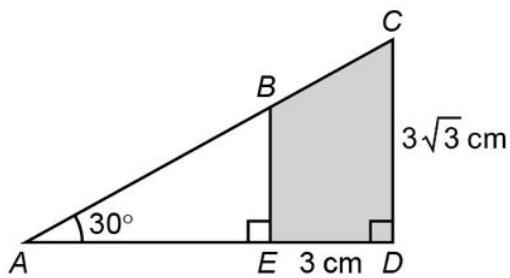


圖 5

(a) 求 AE 。

(b) 求四邊形 $BCDE$ 的面積 。

(如有需要，答案以根式表示。)

(5 分)

10. (a) 化簡 $\cos\theta(1+\tan^2\theta)$ 。

(b) 由此，證明 $[\cos\theta(1+\tan^2\theta)\sin\theta]^2 = \frac{\cos^2(90^\circ-\theta)}{\sin^2(90^\circ-\theta)}$ 。

(5 分)

乙部 (20 分)

11. Figure 6 shows solid A formed by a hemisphere and a right cylinder with a common base of base radius 3 m. The height of solid A is 5 m. It is given that solid B is similar to solid A, and the ratio of the base area of solid A to that of solid B is 9 : 25.

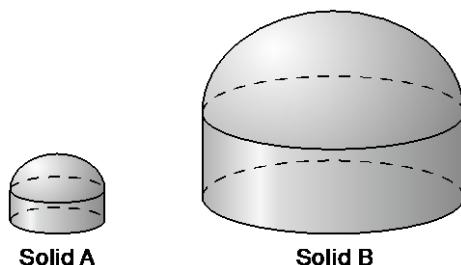


Figure 6

- (a) Find the volume of solid A. (2 marks)

(b) Find the volume of solid B. (3 marks)

(c) Find the total surface area of solid B. (3 marks)

(d) Solid C is formed by removing a cylinder of volume $8\pi \text{ m}^3$ from the bottom of solid A while solid D is formed by removing a cylinder of volume $40\pi \text{ m}^3$ from the bottom of solid B. Are solid C and solid D similar? Explain your answer. (3 marks)

(Express your answers in terms of π if necessary.)

12. In Figure 7, M is the mid-point of AB . P is a point lying on BC such that $BP : PC = 1 : r$ and $MP \perp BC$.

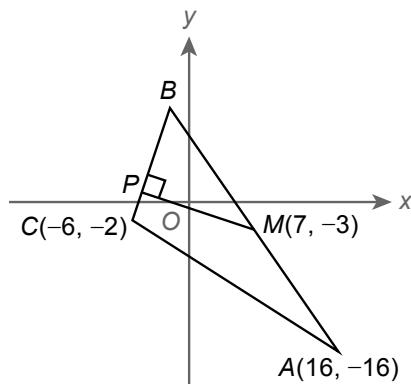


Figure 7

- (a) Find the coordinates of B . (2 marks)

(b) Find the coordinates of P in terms of r . (3 marks)

(c) Find the value of r . (4 marks)

試卷完