

FINAL EXAMINATION
2023 – 2024
QUESTION-ANSWER BOOK

Subject: **Secondary 2 Mathematics**

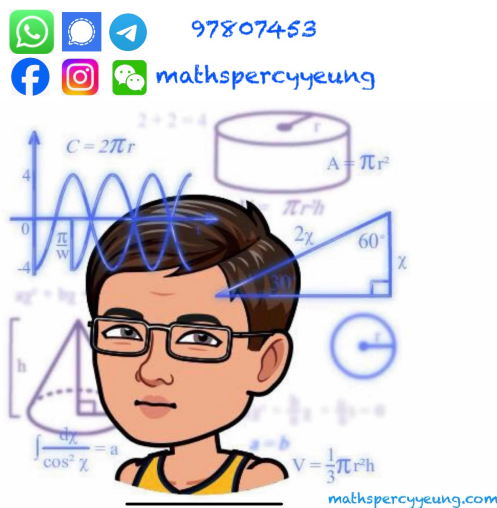
Paper: **I**

Time Allowed: **1 hour**

Total Marks: **100**

INSTRUCTIONS

- (1) Write your name, class and examination number in the spaces provided.
- (2) This paper consists of Three Sections, A1, A2 and B.
- (3) Attempt ALL questions in Sections A1, A2 and B. Write your answers in the spaces provided in this Question-Answer Book. Do not write in the margins.
- (4) Unless otherwise specified, the use of HKEAA approved electronic calculators is allowed.
- (5) Unless otherwise specified, all working must be clearly shown.
- (6) Unless otherwise specified, numerical answers should be exact or correct to 3 significant figures.



No. of pages: **11**

Page	Marks	
2		
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Total		

Section A1 (40 marks): Working steps must be shown in answering questions in this section.

1. Expand the following expressions by using identities.

(a) $(x + 3)(x - 3)$ (2 marks) (b) $(4 - x)^2$ (2 marks)

(c) $(2x + 1)^2$ (2 marks)

2. Factorize the following expressions.

(a) $6a^2 - 2ab$ (2 marks) (b) $6a^2 - 2ab + 3a - b$ (3 marks)

3. Determine whether $3(x + 1) - (x + 2) = 2x - 1$ is an identity. (3 marks)

4. Simplify the following algebraic fractions.

(a) $\frac{6y}{36y^2}$

(1 mark)

(b) $\frac{x-4}{x^2-16}$

(2 marks)

(c) $\frac{1-x^2}{x+1}$

(2 marks)

(d) $\frac{x^2+x}{y+1} \div \frac{x+1}{y^2-1}$

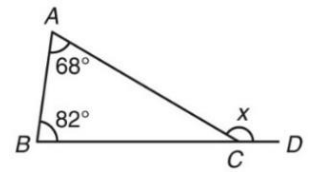
(3 marks)

5. Make y the subject of the formula $-x + 9y = 2y - z$.

(2 marks)

6. In the figure, BCD is a straight line, find the unknowns x .

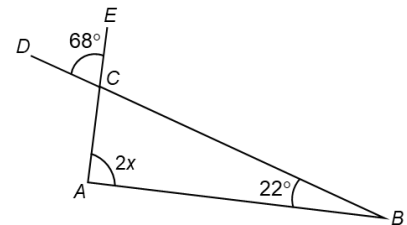
(3 marks)



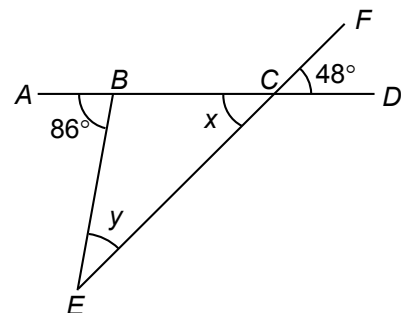
7. Find the unknowns in the following figures.

(5 marks)

(a)



(b)



8. Simplify the following ratios.

(a) 18:63

(2 marks)

(b) $\frac{1}{3} : \frac{1}{18}$

(2 marks)

(c) 9:6:18

(2 marks)

(d) $\frac{1}{3} : \frac{1}{6} : 1$

(2 marks)

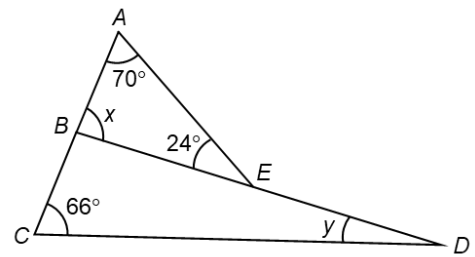
Section A2 (30 marks): Working steps must be shown in answering questions in this section.

1. Prove that $-4(-x - 1) = 4x + 4$ is an identity. (3 marks)

2. If $Ax + Bx^2 \equiv -9x - 7x^2 + 4x$, where A and B are constants, find the values of A and B . (3 marks)

3. In the figure, ABC and BED are straight lines. Find x and y .

(4 marks)



4. If $a : b = 1 : 4$ and $a : c = 3 : 5$, find $a : b : c$.

(3 marks)

5. Determine whether the following points lie on the graph of the equation $4x - 1 = y + 5$. (4 marks)

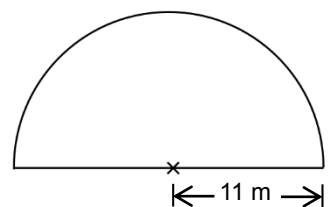
(a) $A(5, 14)$

(b) $B(-2, 4)$

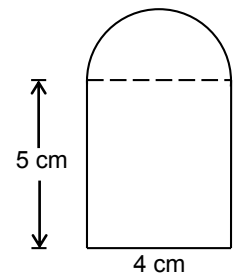
6. Solve the simultaneous equations $\begin{cases} y = 2x - 3 \\ y = 3x - 1 \end{cases}$ by the method of substitution. (3 marks)

7. Solve the simultaneous equations $\begin{cases} 2x + 7y + 6 = 0 \\ 3y - 2x + 4 = 0 \end{cases}$ by the method of elimination. (3 marks)

8. Find the perimeter of a semi-circle with radius 11 m as shown. (3 marks)



9. The figure is formed by a rectangle and a semi-circle. Find the perimeter of the figure. (4 marks)
(Give your answer in terms of π .)



Section B (30 marks): Working steps must be shown in answering questions in this section.

1. If $Ax(x + 5) + B(x - 1) - C \equiv (2x + 3)(x + 1)$, where A , B and C are constants, find the values of A , B and C . (6 marks)

2. Simplify $\frac{x^2 - 14xy + 49y^2}{28xy - 4x^2}$. (4 marks)

3. Solve the simultaneous equations $3x + 11y = 4x + 7y + 23 = 0$ by the method of substitution.

(5 marks)

4. Solve the simultaneous equations $\begin{cases} 3x - 2y = 5 \\ 2x + 3y = 12 \end{cases}$ by the method of elimination.

(5 marks)

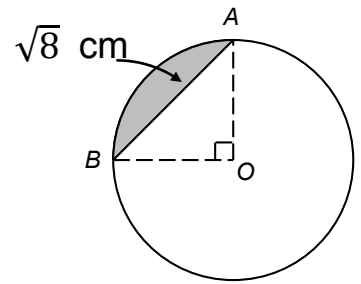
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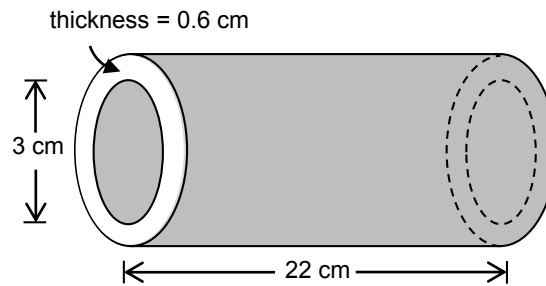
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5. In the figure, O is the center of the circle, $\angle AOB = 90^\circ$ and $AB = \sqrt{8}$ cm. Find the area of the shaded region. (Give your answer correct to 3 significant figures.) (5 marks)



6. The solid in the figure is a right circular cylindrical metal tube of length 22 cm. The inner diameter and the uniform thickness of the metal tube are 3 cm and 0.6 cm respectively.



- (a) Find the volume of metal needed to make the tube. (2 marks)

- (b) Find the total surface area of the tube. (3 marks)

END OF PAPER