Mid-year Examination (2023 – 2024) Secondary 2

MATHEMATICS II

Question-Answer Book

Time allowed : 1 hour
Total marks:100

INSTRUCTIONS

1. Write your Name, Class and Exam. Number in the spaces provided on Page 1.
2. This paper consists of Two Sections, A and B.
3. Attempt ALL questions in Sections A 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 : 9

Page No.	Marks
2	
3	
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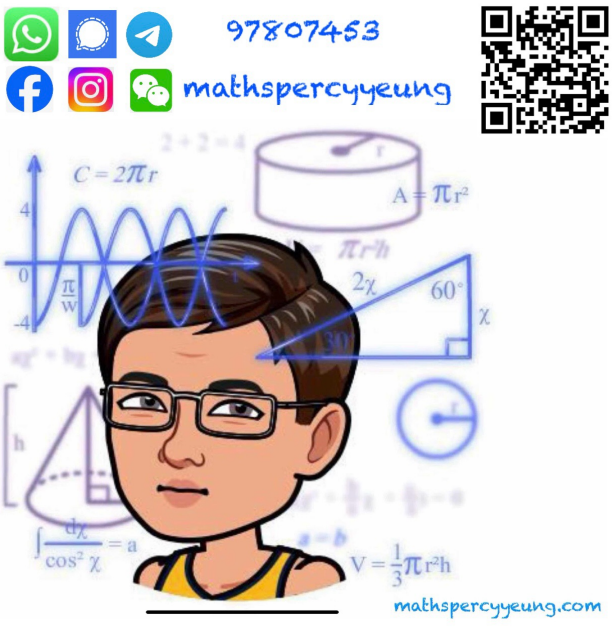
Total	



Section A: (60 marks) Working steps must be shown in answering questions in this section.

1. Simplify the following expressions.

(a) $-\frac{4xy}{2x}$ (1 mark)

(b) $\frac{2(x-1)}{4y(1-x)}$ (2 marks)

(c) $\frac{p+q}{pq+q^2}$ (2 marks)

(d) $\frac{x^2+2x}{x^3} \times \frac{3x}{x+2}$ (3 marks)

(e) $\frac{x+3}{5y^2} \div \frac{4x+12}{y^3}$ (3 marks)

(f) $\frac{1}{3x} + \frac{1}{6x}$ (3 marks)

(g) $-\frac{4x}{3(4x-3)} - \frac{3}{4(3-4x)}$ (4 marks)

(h) $\frac{4}{z^2-16} + \frac{2}{z-4}$ (5 marks)

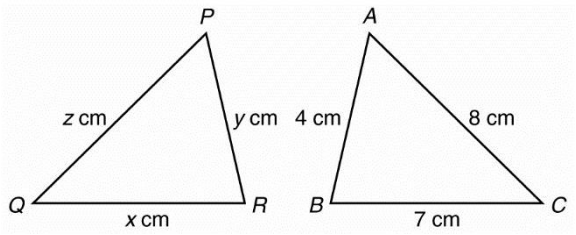
Answers written in the margins will not be marked.

2. Given that $z = 3x - 8y$, find the value of z when $x = 4$ and $y = -2$. (2 marks)

3. Make q the subject of the formula $k = 3q - 9$. (3 marks)

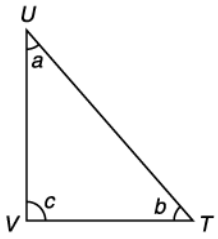
4. Make x the subject of the formula $y = 3(x - z)$. (2 marks)

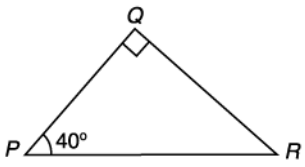
5. (a) In the figure, $\triangle PQR \cong \triangle ACB$. Find the unknowns x, y and z. (3 marks)



Answers written in the margins will not be marked.

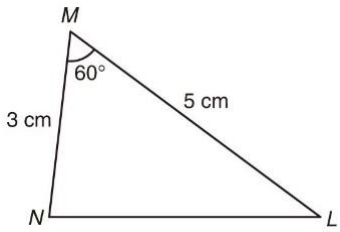
(b) In the figure, $\triangle UVT \cong \triangle PQR$. Find the unknowns a, b and c. (5 marks)

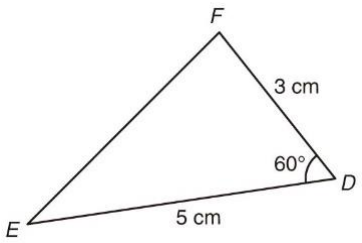




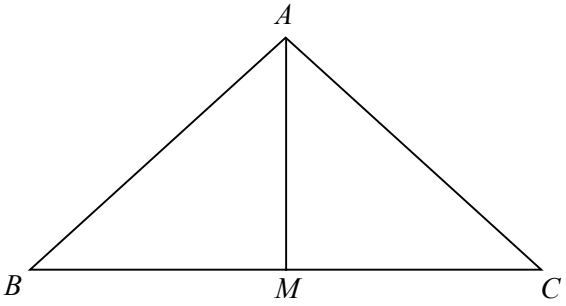
6. In the figure, name a pair of congruent triangles and give the reason. (2 marks)

$\triangle MNL \cong \triangle$_____( )





7. In the figure, $\angle BAM = \angle CAM$ and $\angle B = \angle C$. Prove that $\triangle ABM \cong \triangle ACM$. (4 marks)



Answers written in the margins will not be marked.

8. Complete the following table. (3 marks)

Actual value	Approximation	Absolute error
162.5 cm	163 cm	
59 kg	60 kg	
24.55 cm	25 cm	

9. Complete the following table. (3 marks)

Measured value	Scale of interval of the measuring tool	Maximum absolute error
14.3 s	0.1 s	
12.3 cm	0.2 cm	
850 g	5 g	

10. The height of Abby is 163 cm, correct to the nearest 1 cm, find (5 marks)

(a) the maximum absolute error

(b) the relative error and

(c) the percentage error.

Answers written in the margins will not be marked.

11. Complete the following table. (5 marks)

Measured value	Lower limit of the actual value	Upper limit of the actual value
\$197 (cor. to \$1)	\$196.5	
250 mL (cor. to the nearest 10 mL)		
393 (cor. to 0.1)		

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

1. Simplify $\frac{8}{2-p}+\frac{4p}{p-2}$. (3 marks)

2. Simplify $\frac{x}{36x+9k}\div\frac{4x^2}{2k+8x}$. (4 marks)

Answers written in the margins will not be marked.

3. Simplify $\frac{8a^2}{a^2-2ab+b^2} \times \frac{ab-b^2}{16ab} \div \frac{2a+2a}{b}$. (5 marks)

4. Make y the subject of the formula $\frac{1}{y} - \frac{3}{x} = 7$. (3 marks)

5. Make k the subject of the formula $y = \frac{k+1}{k-1}$. (4 marks)

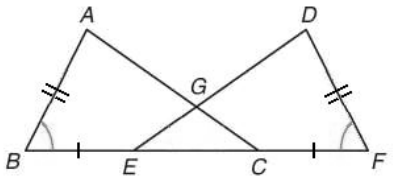
Answers written in the margins will not be marked.

6. (a) (i) Factorize $x^2 + 6x + 9$. (1 mark)

(ii) Factorize $x^2 - 9$. (1 mark)

(b) Hence, simplify $\frac{1}{x^2+6x+9} - \frac{1}{x^2-9}$ (5 marks)

7. In the figure, *BECF* is a straight line. $BE = CF$, $AB = DF$ and $\angle ABC = \angle DFE$. Prove that $\triangle ABC \cong \triangle DFE$. (4 marks)



Answers written in the margins will not be marked.

8. David measured the volume of water and the measured value is 20.5 mL, correct to the nearest 0.5 mL.

(a) Find the percentage error of the measurement. (3 marks)
(Give your answer correct to 3 significant figures.)

(b) If the percentage error is smaller than 3%, the measurement is clamed to be precise. David said his measurement is precise, is he correct? (2 marks)

9. The capacity of a can is measured to be 355 mL. If the relative error is 0.01, find

(a) the maximum absolute error of the measurement, (2 marks)

(b) the range of the actual capacity of the can. (3 marks)

END OF PAPER

Answers written in the margins will not be marked.

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Page total