2022-2023 S4
1st TERM EXAM
MATH CP
PAPER 1

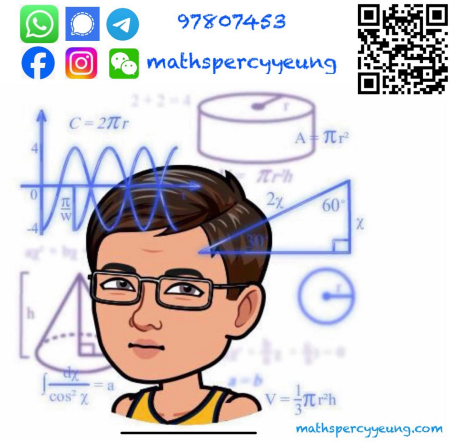
2022 – 2023
S4 First Term Examination

MATHEMATICS Compulsory Part

PAPER 1

Question–Answer Book

9th January, 2023
8:15 am – 9:15 am (1 hour)
This paper must be answered in English



Sections	Marks
A (1 – 3)	
A (4 – 8)	
A Total	**/36**
B Total	**/14**
TOTAL	**/50**

INSTRUCTIONS

1. Write your name, class and class number in the spaces provided on this cover.

2. This paper consists of THREE sections, A(1), A(2) and B.

3. Attempt ALL questions in this paper. Write your answers in the spaces provided in this Question – Answer Book. Do not write in the margins. Answers written in the margins will not be marked.

4. Unless otherwise specified, all working must be clearly shown.

5. Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.

6. The diagrams in this paper are not necessarily drawn to scale.

Section A(1) (16 marks)

1. Simplify $\dfrac{m^4 n^{-3}}{(m^{-2}n^5)^3}$ and express your answer with positive indices. (3 marks)

2. Make *d* the subject of the formula $\dfrac{2}{c} - \dfrac{3}{d} = -5$. (3 marks)

Answers written in the margins will not be marked

3. Factorize

(a) $3x^2 - 5xy - 2y^2$,

(b) $9x + 3y - 3x^2 + 5xy + 2y^2$. (4 marks)

4. If the quadratic equation $3x^2 + 2x - k = 1$ has real root(s), find the range of values of k.

(3 marks)

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5. Simplify $5\sqrt{x^3}+\frac{18x^2}{\sqrt{36x}}-2x\sqrt{x}$. (3 marks)

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Section A(2) (20 marks)

6. When a polynomial $f(x) = x^3 + x^2 - 9x - 5$ is divided by $g(x)$, the quotient is $x^2 + 3x - 3$ and the remainder is -11.

(a) Find $g(x)$. (3 marks)

(b) Find the remainder when $f(x) = x^3 + x^2 - 9x - 5$ is divided by $x + 1$. (2 marks)

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7. Two straight lines $L_1 : 5x - 8y + 20 = 0$ and $L_2 : 2x - 5y + 17 = 0$ intersect at the point P.

(a) Find the coordinates of P. (2 marks)

(b) If the straight line L_3 passes through P and perpendicular to L_2, find the equation of L_3. (3 marks)

(c) Find the area bounded by x-axis, L_1 and L_3. (3 marks)

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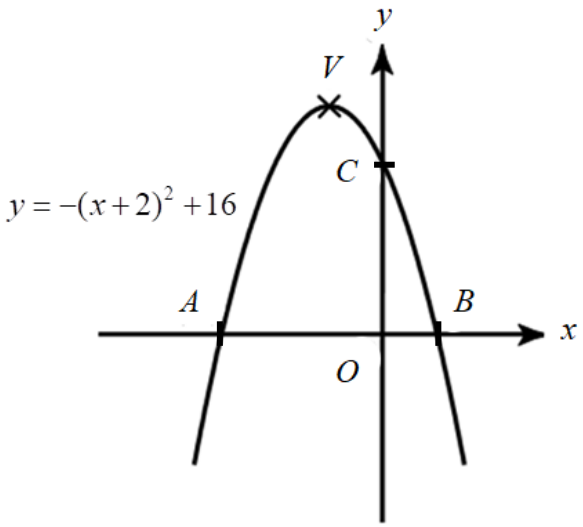
8. The figure shows the graph of the function $y = -(x+2)^2 + 16$. Find the coordinates of A, B, C, the vertex V and the axis of symmetry. (7 marks)



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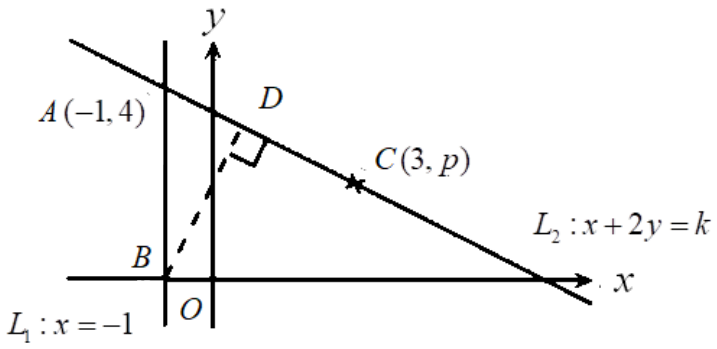
Section B (14 marks)

9. The figure shows two straight lines $L_1 : x = -1$ and $L_2 : x + 2y = k$. L_1 intersects L_2 at $A(-1, 4)$ and cuts the x-axis at B. $C(3, p)$ is a point on L_2 and O is the origin. D is a point on L_2 such that BD is perpendicular to L_2.



(a) Find the values of k and p. (3 marks)

(b) (i) Find the coordinates of D.

(ii) Is BD the perpendicular bisector of AC? Explain your answer.

(4 marks)

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10. Let a and b be constants. It is given that $f(x) = x^3 + ax^2 + bx - 4$ is divisible by $x+1$. When $f(x)$ is divided by $2x+1$, the remainder is $-\frac{9}{8}$.

(a) Find the values of a and b. (3 marks)

(b) Factorize $f(x)$. (2 marks)

(c) Peter claims that the equation $f(x) = 0$ has three distinct real roots. Do you agree? Explain your answer. (2 marks)

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END OF PAPER