2024-2025 S5
2nd TERM UT
MATH CP
PAPER 1

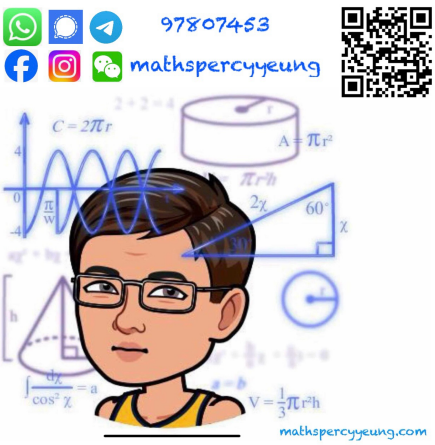
2024 – 2025
S5 Second Term Uniform Test

MATHEMATICS Compulsory Part

PAPER 1

Question–Answer Book

20th March, 2025
9:45 am – 11:00 am (1 hour 15 minutes)
This paper must be answered in English



Sections	Marks
A (1 – 3)	
A (4 – 7)	
A Total	**/32**
B Total	**/28**
TOTAL	**/60**

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) (14 marks)

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

2. Make k the subject of the formula $\dfrac{1}{8h}-\dfrac{1}{4k}=\dfrac{1}{2}$. (3 marks)

Answers written in the margins will not be marked

3. Factorize
   (a) $4x^3 - 20x^2y$,
   (b) $4x^3 - 20x^2y - xy^2 + 5y^3$.

(4 marks)

4. (a) Find the range of values of x which satisfy $\frac{11-5x}{3} > 1-2x$ or $3x+8 \geq 2$.
   (b) How many negative integer(s) satisfy the compound inequality in (a)?

(4 marks)

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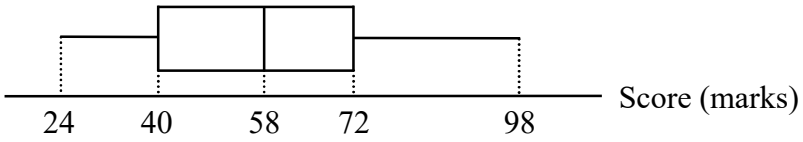
Section A(2) (18 marks)

5. The box-and-whisker diagram below shows the distribution of the scores (in marks) of 30 students in a mathematics test. It is given that the mean of this distribution is 60 marks.



(a) Find the range and the inter-quartile range of the above distribution. (2 marks)

(b) Since four students did not attend the above test, they have to take a make-up test. Their scores in the make-up test are 42 marks, 56 marks, 67 marks and 75 marks. The mathematics teacher includes these scores in the distribution.

(i) Find the new mean.

(ii) Someone claims that the median will decrease after combining the four new scores. Do you agree? Explain your answer.

(4 marks)

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6. In Figure 1, AB produced and DC produced meet at P. AC cuts BD at Q. $AD = QD$, $\angle APC = 42°$ and $\angle BDC = 16°$.

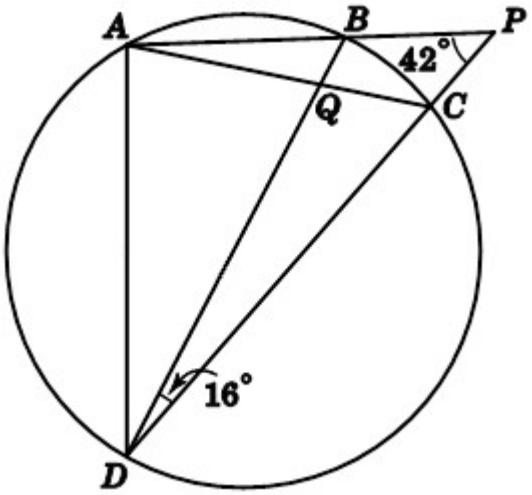

Figure 1

(a) Find $\angle AQD$. (3 marks)

(b) Is BD a diameter of the circle? Explain your answer. (2 marks)

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7. The coordinates of the points A and B are $(4, 7)$ and $(0, -1)$ respectively.

(a) If the circle C passes through A and the centre of C is B, find the equation of C.

(2 marks)

(b) P is a moving point in the rectangular coordinate plane such that $AP = BP$. Denote the locus of P by Γ.

(i) Find the equation of Γ.

(ii) Let O be the origin. Γ cuts the x-axis and the y-axis at M and N respectively. Find the area of ΔOMN.

(5 marks)

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Section B (28 marks)

8. In Figure 2, TA and TB are the tangents to the circle at P and Q respectively. O is the centre of the circle. $\angle PRO = 32°$ and $\angle BQR = 53°$.

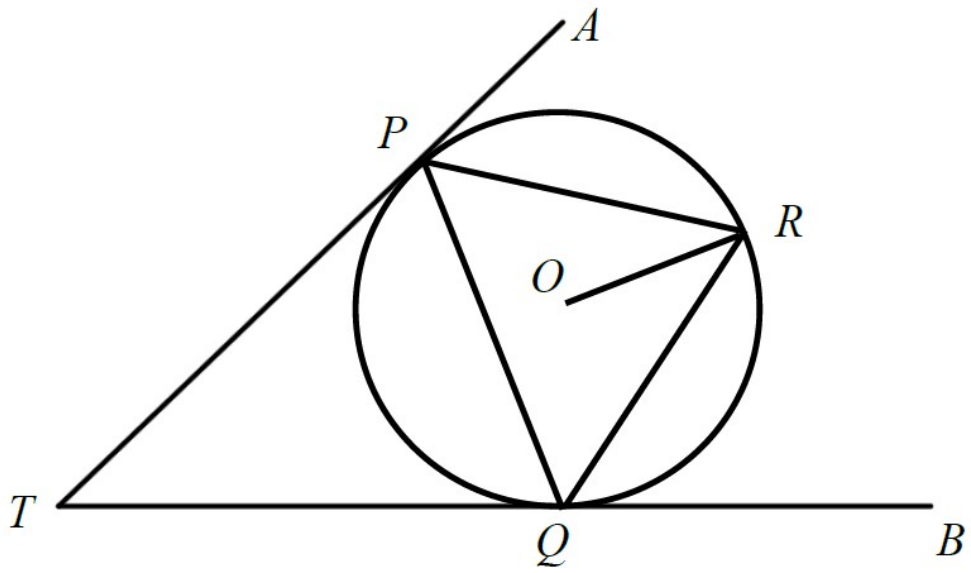

Figure 2

(a) Find $\angle ORQ$. (2 marks)

(b) Find $\angle PTQ$. (3 marks)

(c) Given that the radius of the circle is 5 cm , find the perimeter of ΔPTQ . (3 marks)

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9. In Figure 3, the shaded region (including the boundary lines) represents the solution of a system of inequalities.

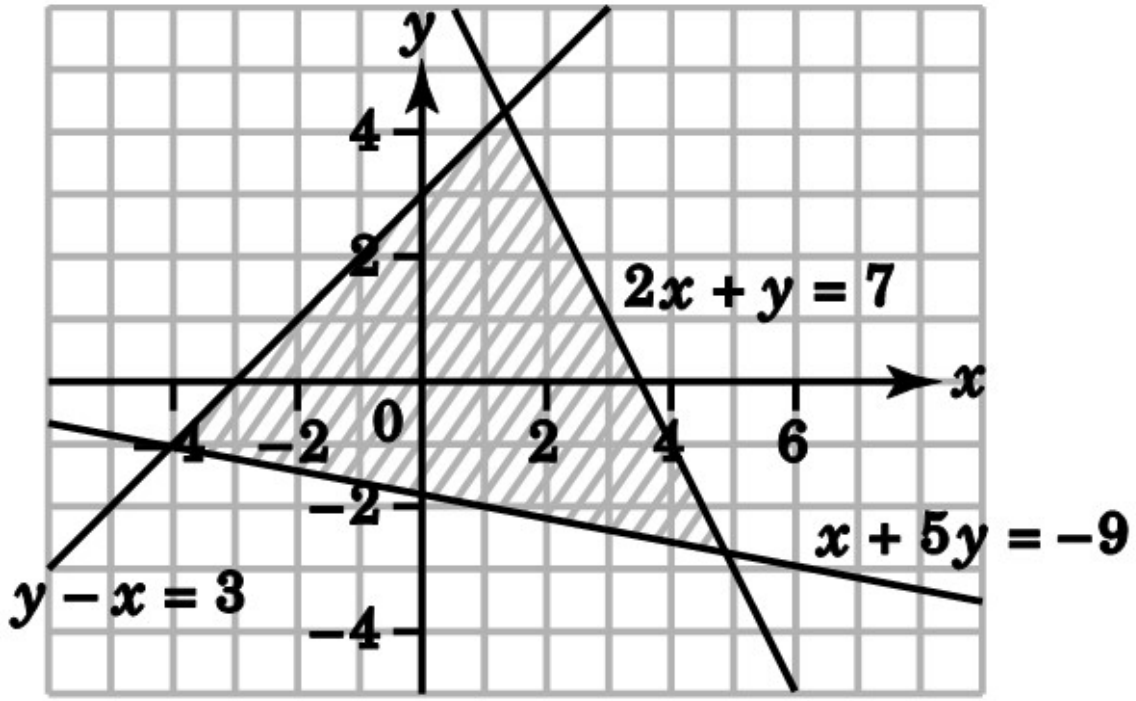

Figure 3

(a) Find the system of inequalities. (2 marks)

(b) If both x and y are integers, find the maximum and the minimum values of $4x-5y$, where (x, y) is a point lying in the shaded region. (4 marks)

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10. The coordinates of the centre of the circle C are $(5, 3)$. It is given that the y-axis is a tangent to C.

(a) Find the equation of C. (2 marks)

(b) The slope and the y-intercept of the straight line L are -2 and k respectively. If L cuts C at A and B, express the coordinates of the mid-point of AB in terms of k.

(5 marks)

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11. Figure 4(a) shows a cube $ABCDEFGH$ of side $4\,\text{cm}$. P and Q are the mid-points of AB and EH respectively. A geometric model is made by cutting off $BGHCQFP$ from $ABCDEFGH$ as shown in Figure 4(b).

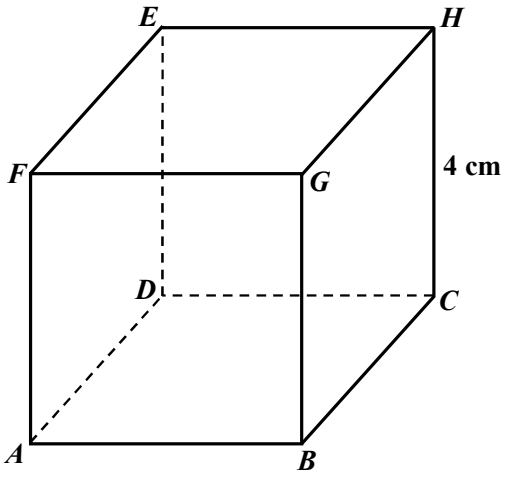

Figure 4(a)

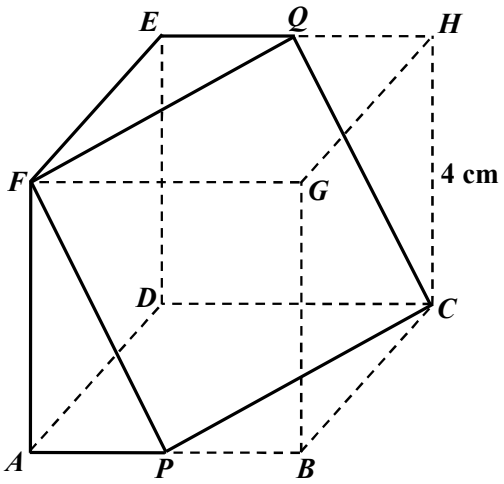

Figure 4(b)

(a) Find $\angle PCQ$. (4 marks)

(b) Someone claims that the angle between the plane $CQFP$ and the plane $ADCP$ exceed $70°$. Do you agree? Explain your answer. (3 marks)

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