Hillcrest High School

MATHEMATICS P2

NOVEMBER 2025

Grade 10

MARKS: 100

TIME: 2 Hours

EXAMINER: Mrs Woodrow

MODERATOR: Mr Reuben

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions

1. This test consists of 9 pages.
2. This test consists of 9 questions.
3. Read all questions carefully before answering.
4. Answer ALL the questions in the space provided.
5. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining your answers.
6. Answers only will NOT necessarily be awarded full marks.
7. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
8. If necessary, round off answers correct to TWO decimal places, unless stated otherwise.
9. Diagrams are not necessarily drawn to scale.
10. Write neatly and legibly.

QUESTION 1

1. A group of High School learners carried out a survey of the number of Speckled Eggs in 25 packets produced by Mister Sweets. Their results are shown in the stem-and-leaf diagram below.

2	4	6	6	7	7									
3	0	0	0	0	0	1	1	5	5	5	6	6	7	7
4	0	0	1	1	2	4								

Key : $2/4 = 24$

1.1. Write down the modal number of sweets in a packet. (1)

1.2. Determine the following measures of spread:

1.2.1. Q_2 (1)

1.2.2. Q_1 (1)

1.2.3. Q_3 (1)

1.3. Calculate the range. (2)

1.4. Draw a box-and-whisker plot illustrating the above information on the grid below. (3)

1.5. Comment on the distribution of the data. (1)

1.6. Write down the number of packets that lie in the upper quartile of the given data. (1)

[11]

QUESTION 2

2. Fifty people were asked to determine what percentage of their cell phone usage is spent on making calls. A summary of the percentages is given in the table.

Percentage	Frequency		
$10 \leq x < 20$	12		
$20 \leq x < 30$	8		
$30 \leq x < 40$	2		
$40 \leq x < 50$	13		
$50 \leq x < 60$	15		

2.1. Showing all working, determine the estimated mean for the given data. (4)

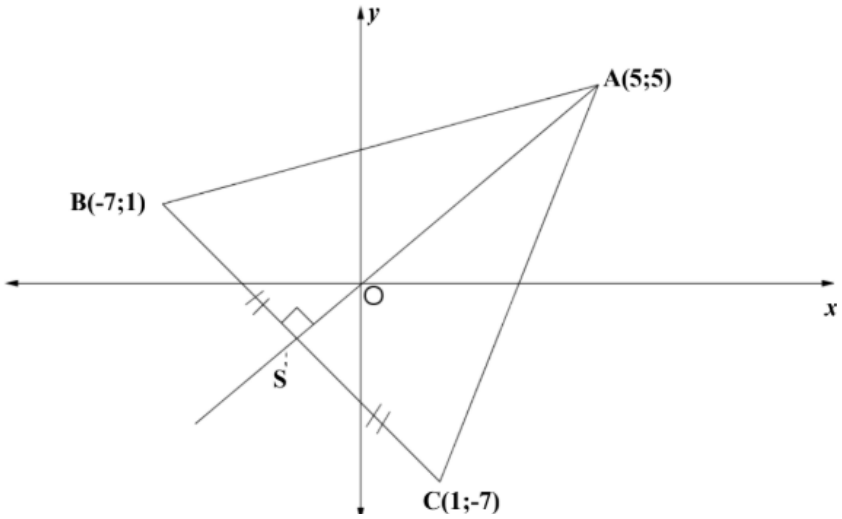
2.2. Write down the modal class. (1)

2.3. In which interval does the median lie? (1)

[6]

QUESTION 3

3. In the Cartesian Plane below, points A(5; 5), B(–7; 1) and C(1; –7) are the vertices of a triangle. Point S is the midpoint of BC. The line AS is perpendicular to BC.



3.1. Determine the coordinates of point S. (2)

3.2. Determine the gradient of the line AC. (2)

3.3. Give the gradient of line that is perpendicular to AC (no calculations necessary). (1)

3.4. Determine the distance of BC. (2)

3.5. Determine the area of ΔABC. (3)

3.6. The coordinates of D so that ABDC is a parallelogram (2)

[12]

QUESTION 4

4. TRIGONOMETRY

4.1. Use your calculator to simplify the following expressions and round your answer off correct to three decimal digits. $\hat{A} = 34{,}5°$ and $\hat{B} = 46°$

4.1.1. $cos(\hat{A} + \hat{B})$ (1)

4.1.2. $4tan\hat{B}$ (1)

4.2. Simplify the following without using a calculator:

4.2.1. $2\tan 45° - sin^2 30° + \frac{2}{\sqrt{3}}\cos 30°$ (4)

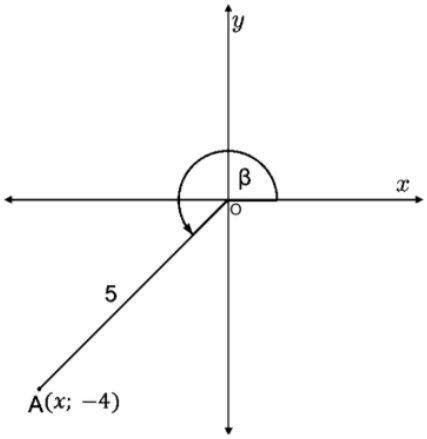
4.2.2. $\frac{tan^2 30°}{sin^2 60°} + \frac{\cos 60°}{2}$ (4)

4.3. Calculate the value of x where $0° \leq x \leq 90°$

4.3.1. $\sin 2x = \frac{2}{3}$ (2)

4.3.2. $-2\tan(x - 9°) + 1 = 0$ (3)

4.4. In the figure below, $OA = 5$ units and $A(x; -4)$. Use the figure and write down the values of the following without using a calculator:



4.4.1. Calculate the value of x. (2)

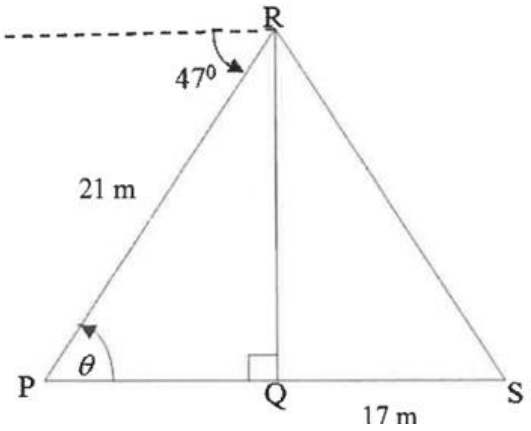
4.4.2. $cos\beta$ (1)

4.4.3. $sin\beta + tan\beta$ (3)

[21]

QUESTION 5

5. RQ is a vertical pole. The foot of the pole, Q, is on the same horizontal plane as P and S. The pole is anchored with wire cables RS and RP. The angle of depression from the top of the pole to point P is $47°$. PR is $21m$ and QS is $17m$. $R\hat{P}Q = \theta$



5.1. Determine the size of θ, with reason. (1)

5.2. Calculate the length of RQ. (3)

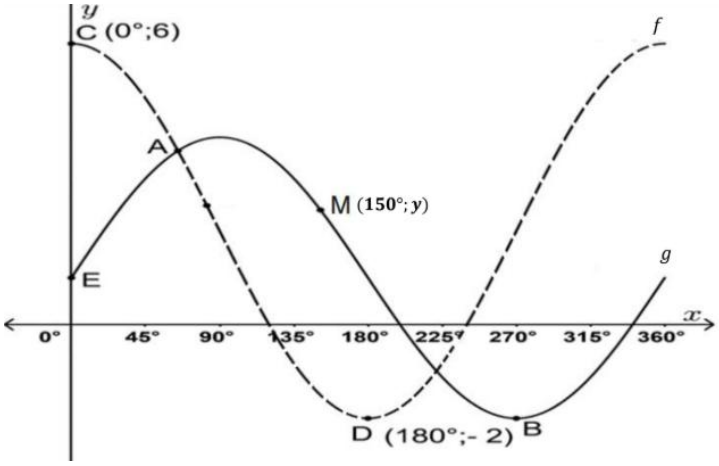
5.3. Hence, calculate the size of $\hat{S}$. (2)

5.4. If P, Q and S lie in a straight line how far apart are the anchors of the wire cables. (4)

[10]

QUESTION 6

6. Given: $f(x) = a\cos x + q,\ g(x) = 3\sin x + 1,\ C(0°;6)$ and $D(180°;-2)$.



6.1. Write down the values of a and q. (2)

6.2. Write down the coordinates of E and B. (2)

6.3. State the range of f. (1)

6.4. State the period of g. (1)

6.5. If $M(150°;\ y)$, find the value of y. (1)

6.6. If $h(x) = g(x) - 4$ give the minimum value of h. (1)

[8]

GIVE REASONS FOR YOUR STATEMENTS IN QUESTIONS 7 AND 8

QUESTION 7

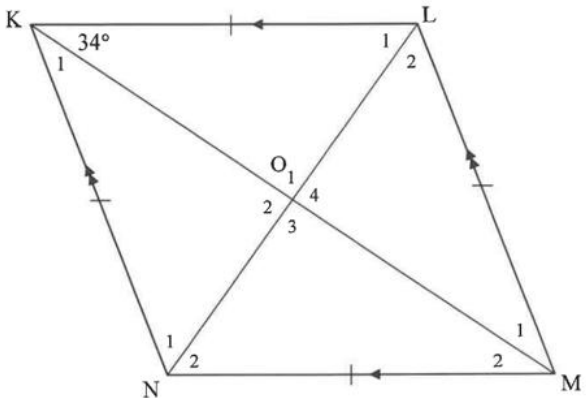
7. EUCLIDEAN

7.1. Complete the following statements :-

7.1.1. The diagonals of a parallelogram _____ each other. (1)

7.1.2. The line joining the mid-points of two sides of a triangle is _____ to the third side and is _____ of the third side. (2)

7.2. $KLMN$ is a rhombus with diagonals intersecting at O. $L\hat{K}M = 34°$.

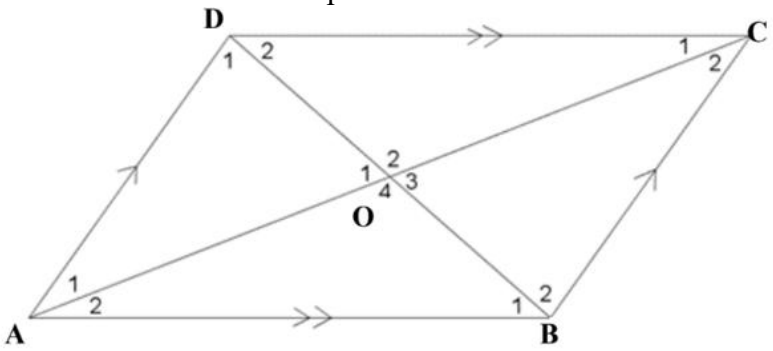


7.2.1. Write down the size of $\hat{O}_1$. (1)

7.2.2. Calculate the size of $\hat{L}_1$. (2)

7.2.3. Calculate the size of $K\hat{N}M$. (2)

7.3. In the diagram below, a parallelogram $ABCD$ is drawn such that $AD \parallel BC$ and $DC \parallel AB$. AC and DB intersect at point O.

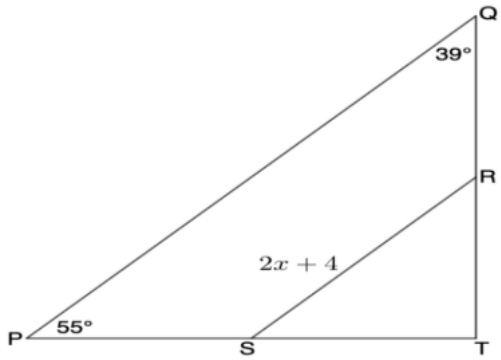


Prove that $DO = OB$ and $AO = OC$ (5)

[13]

QUESTION 8

8. In the diagram below, R is the midpoint of QT and S is the midpoint of PT. The length of $SR = 2x + 4$. $\hat{Q} = 39°$ and $\hat{P} = 55°$.



8.1. Determine the length of PQ in terms of x. (2)

8.2. If the length of PQ is 18, determine the value of x. (3)

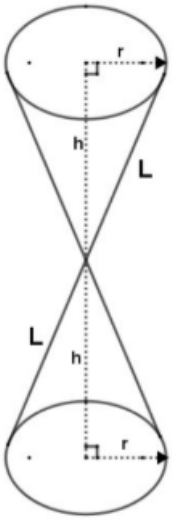
8.3. Prove that $\Delta TRS \;|||\; \Delta TQP$ (5)

[10]

QUESTION 9

9. A solid wooden stand consists of two identical cones. It is given that $r = 8mm$ and $h = 15mm$.

$$SAcone = \pi r^2 + \pi rs$$



9.1. Determine the L the slope length of each cone. (3)

9.2. Determine the total surface area of the stand to 1 decimal. (4)

9.3. The volume of the original stand is 640π. What will the volume of the stand be if all the lengths of the sides are halved? (2)

[9]

TOTAL **[100]**