education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT

GRADE 11

MATHEMATICS P2

NOVEMBER 2025

Clasmorephysics.com

MARKS: 150

TIME: 3 hours

This question paper consists of 13 pages and 1 information sheet.

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INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 11 questions.
2. Answer ALL the questions in the SPECIAL ANSWER BOOK provided.
3. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining your answers.
4. Answers only will NOT necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round off answers correct to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. An information sheet with formulas is included at the end of the paper.
9. Write neatly and legibly.

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QUESTION 1

According to the SABS (South African Bureau of Standards), the acceptable standard deviation for a 340 ml can of Coke is equal to 2,74 ml. Out of a sampling of 20 cans the following were measured:

342	338	336	340	340	345	338	339	340	334
341	337	336	340	335	336	342	340	337	336

1.1 Calculate the mean volume of the 20 cans. (2)

1.2 Calculate the standard deviation of the 20 cans. (1)

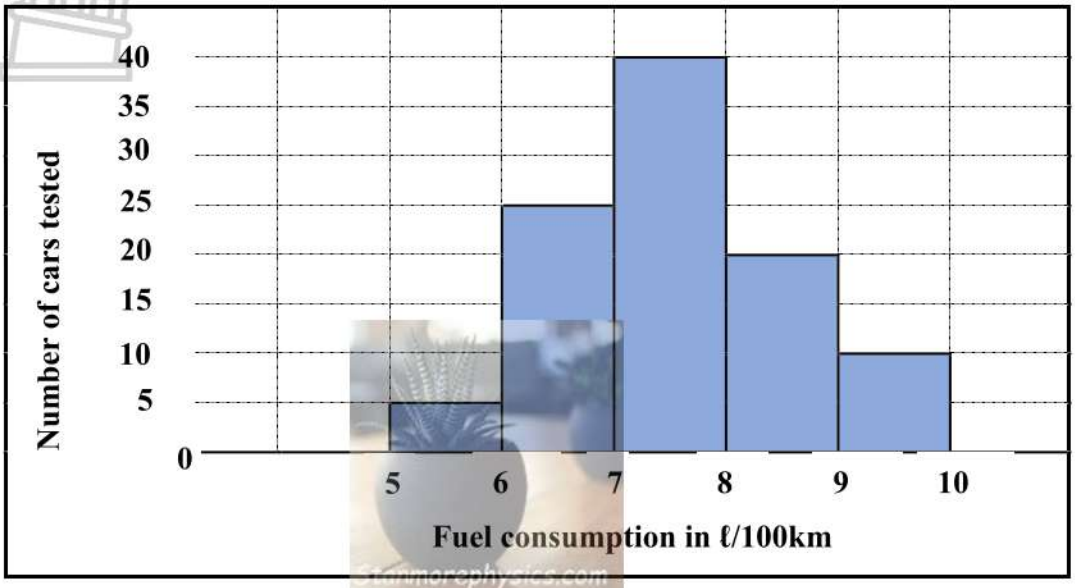
1.3 Calculate which percentage of the 20 cans lies between one standard deviation of the mean. (3)

1.4 What conclusion can the official of the SABS make regarding the sampling? (1)
[7]

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QUESTION 2

The fuel consumption of a car is expressed as the number of liters per 100 kilometers (*l*/100 km) which the car use. The histogram below indicates the results of tests done on a different models of a specific car.



2.1 How many cars were tested? (1)

2.2 Write down the modal class. (1)

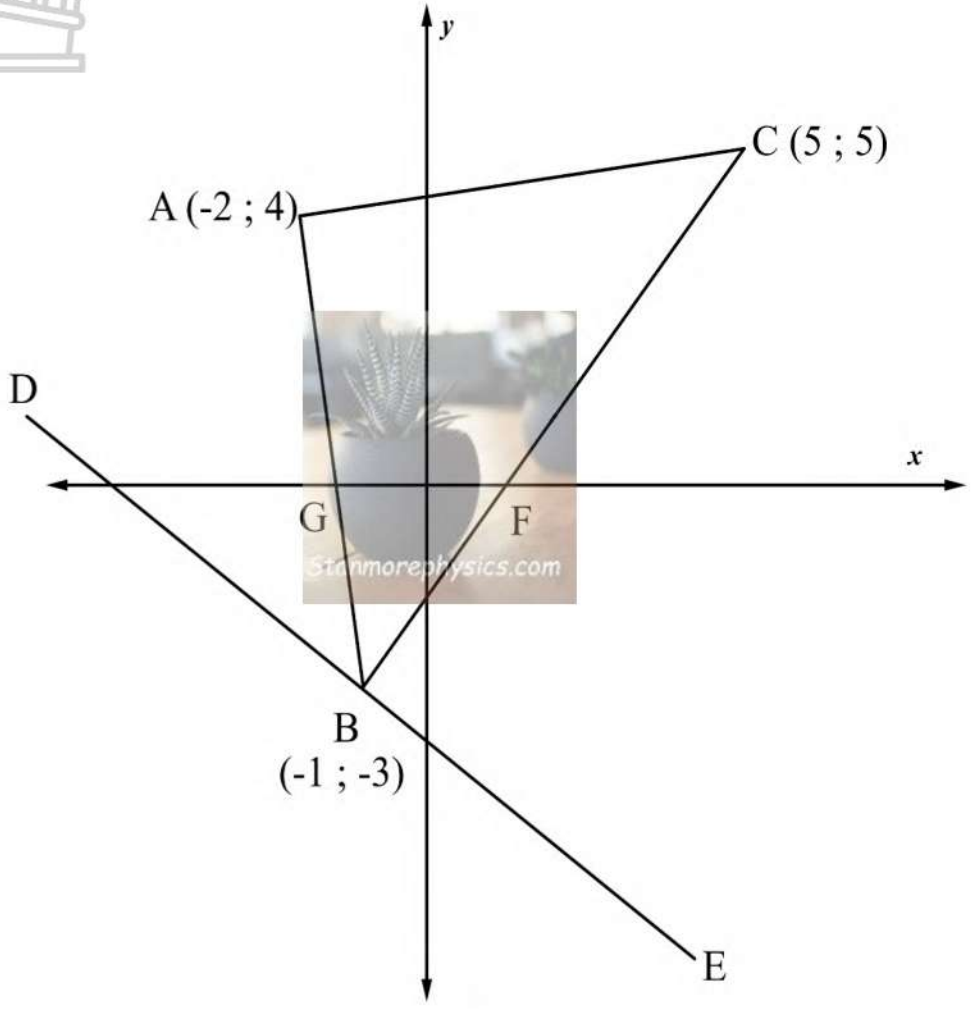
2.3 Use the histogram to complete the frequency table in the answer book. (3)

2.4 Draw an ogive to represent the data. (4)

2.5 Use the ogive to calculate the interquartile range. (3)
[12]

QUESTION 3

In the diagram below ΔABC has vertices $A(-2\,;4)$, $B(-1\,;-3)$ and $C(5\,;5)$. Point B lies on line DE. The *x*-intercepts of CB and AB are F and G respectively. β and θ are the angles of inclination for lines BC and AB respectively.



3.1 Calculate the length of AC. (2)

3.2 Determine the gradient of AB. (2)

3.3 Prove that ΔABC is a right angle triangle. (3)

3.4 If $BC \perp DE$, calculate the size of $A\hat{B}E$. (5)

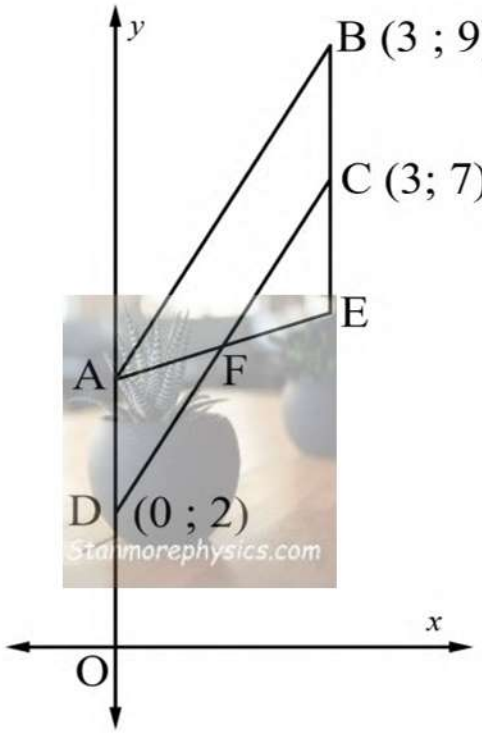
3.5 Determine the equation of line DE. (3)

3.6 Calculate the area of ΔABC. (4)

[19]

QUESTION 4

In the diagram below, ABCD is a parallelogram with vertices A and $D(0;2)$ lying on the *y*-axis. The side BC is produced to E such that BC = CE. $B(3;9)$ and $C(3;7)$ are given. The length of AD is 2 units. The line segment AE intersects DC at F.



4.1 Calculate the coordinates of A. (1)

4.2 Write down the equation of line BE. (1)

4.3 Why is F the midpoint of AE? (1)

4.4 Hence, find the coordinates of F. (2)

4.5 Determine whether points O, F and B are collinear. (4)
[9]

QUESTION 5

Answer question 5.1 to 5.4, **without using a calculator:**

5.1 If $\sin A = -\frac{3}{5}$ and $270° < A < 360°$.

Determine, **without using a calculator**, the value of:

5.1.1 cosA (3)

5.1.2 $\tan(A - 180°)$ (2)

5.2 If $\tan\alpha = p$; $\sin\alpha < 0$ and $p > 0$, determine sinα in terms of p. (4)

5.3 Determine the value of:

$$\frac{\sin(-120°).\tan 330°}{\cos(360° - x).\sin(90° + x) + \sin^2(180° + x)}$$ (8)

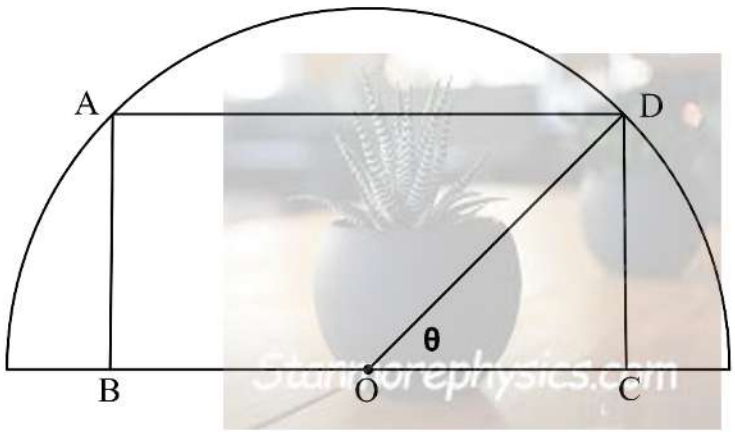
5.4 Prove the following identity:

$$\frac{(2 - 2\sin^2 x)(1 + 2\tan^2 x)}{1 + \sin^2 x} = 2$$ (6)

5.5 Determine the general solution of the equation:

$$2sin\theta + 3cos\theta = 0$$ (4)

5.6 In the diagram below, ABCD is a rectangle in a semicircle with center O, and $C\hat{O}D = \theta$.
For what value of θ (correct to 2 decimal places) will rectangle ABCD become a square? (Clearly show ALL calculations.)

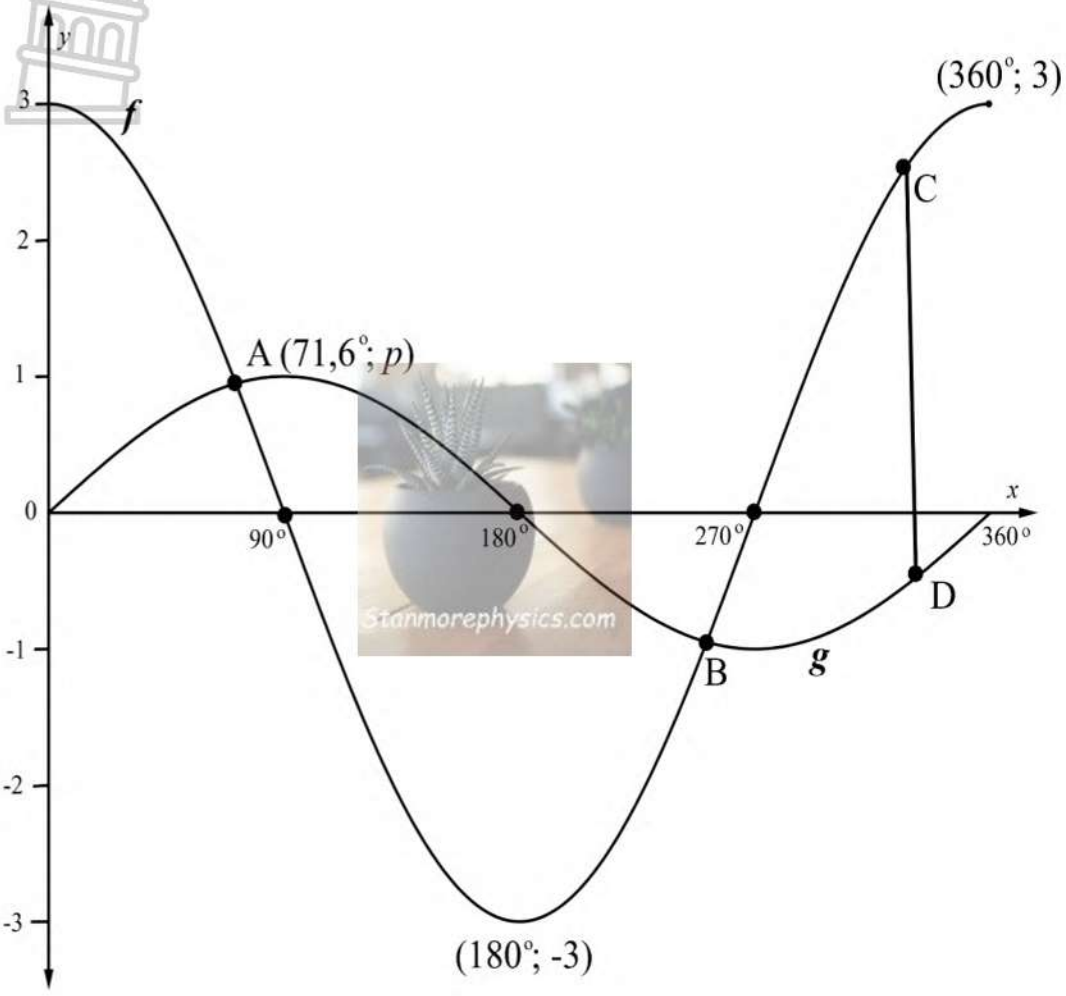


(4)

[31]

QUESTION 6

In the diagram below, the graphs of $f(x) = a\cos x$ and $g(x) = \sin bx$ are drawn for the interval $x \in [0°;360°]$.



6.1 Determine the values of a and b. (2)

6.2 Write down the range of f. (2)

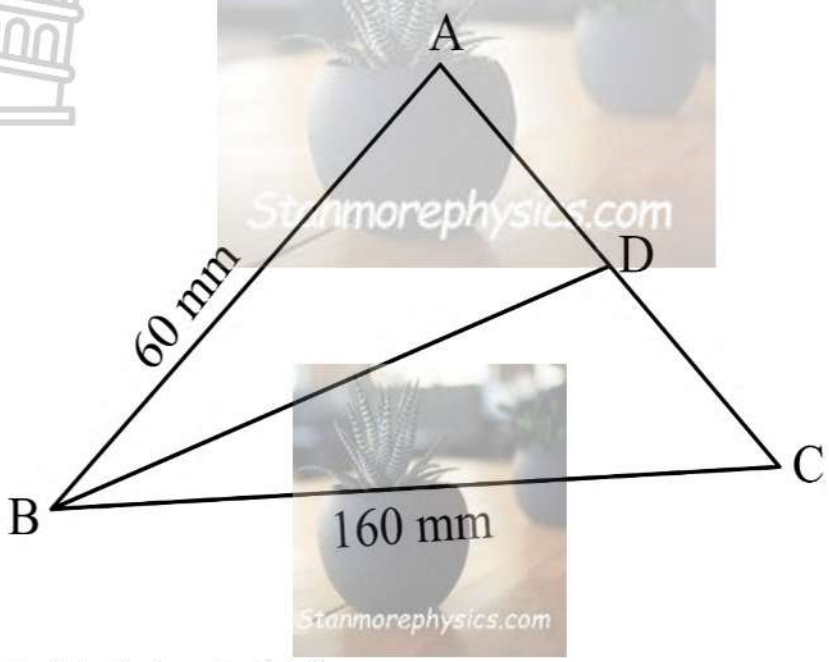
6.3 Determine the value of p rounded off to TWO decimal places. (2)

6.4 Give the coordinates of B. (2)

6.5 Calculate the length of CD, correct to TWO decimal places.
Given CD is parallel to the y-axis and the y-coordinate of C is $2p$. (5)
[13]

QUESTION 7

In the diagram below, ΔABC is drawn with D on AC that AD = DC.
Line BD is drawn. BC = 160 mm, AB = 60 mm and $A\hat{B}C = 60°$.



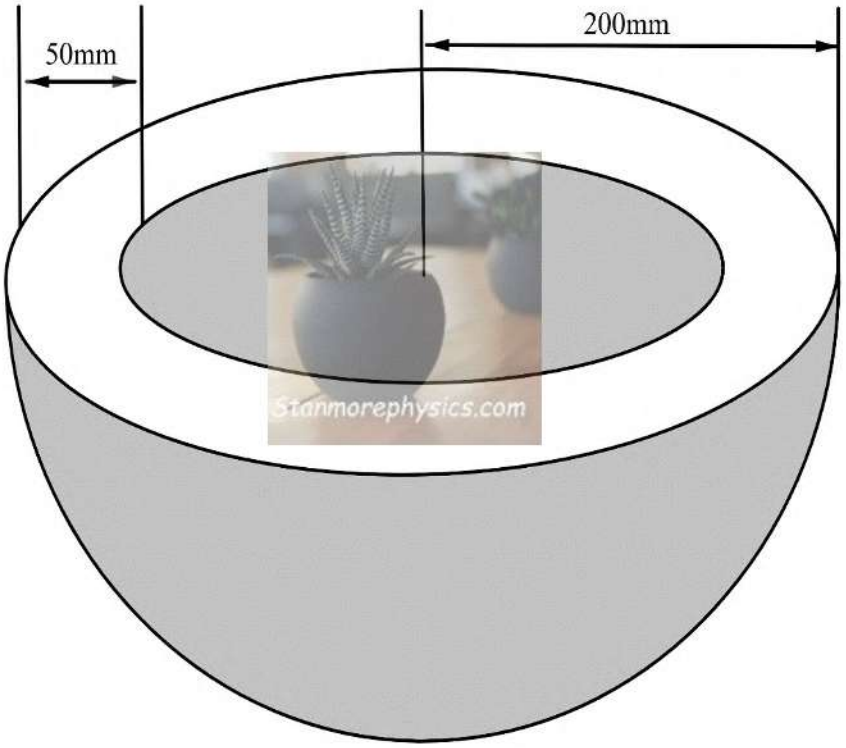
7.1 Calculate the length of AC. (3)

7.2 Hence, prove that the area of ΔABD = $1200\sqrt{3}$ mm^2. (5)
[8]

QUESTION 8

The wall of a semi-sphere with a radius of 200 mm, must be cast. The wall must be 50 mm thick, as shown below.

Volume of sphere $= \frac{4}{3}\pi r^3$



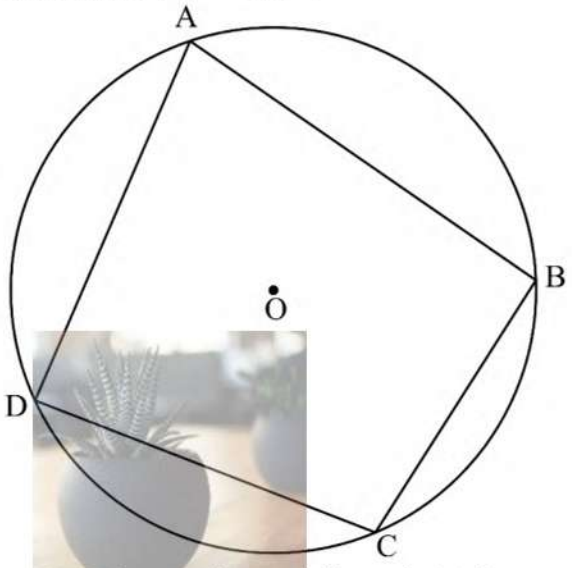
8.1 Calculate the volume of the mixture needed to cast the wall of the semi-sphere. (4)

8.2 Calculate the area of the FLAT surface of the wall of the cast. (3)
[7]

Provide reasons for your statements in QUESTIONS 9, 10 and 11.

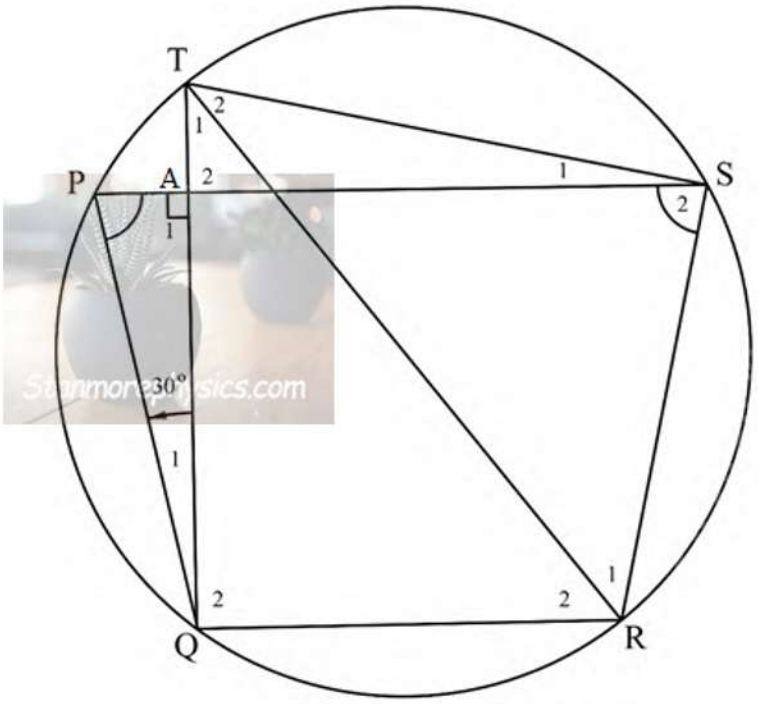
QUESTION 9

9.1 In the diagram, ABCD is a cyclic quadrilateral in a circle with center O.
Prove the theorem that states: $\hat{A} + \hat{C} = 180°$.



(5)

9.2 In the diagram below, PQRS is a cyclic quadrilateral. QA is perpendicular to PS.
QA produced meets the circle at T. $Q\hat{P}S = P\hat{S}R$ and $P\hat{Q}A = 30°$.



9.2.1 Calculate, with reasons, three angles in the diagram which are equal to 60°. (4)

9.2.2 Calculate $Q\hat{R}S$. (2)

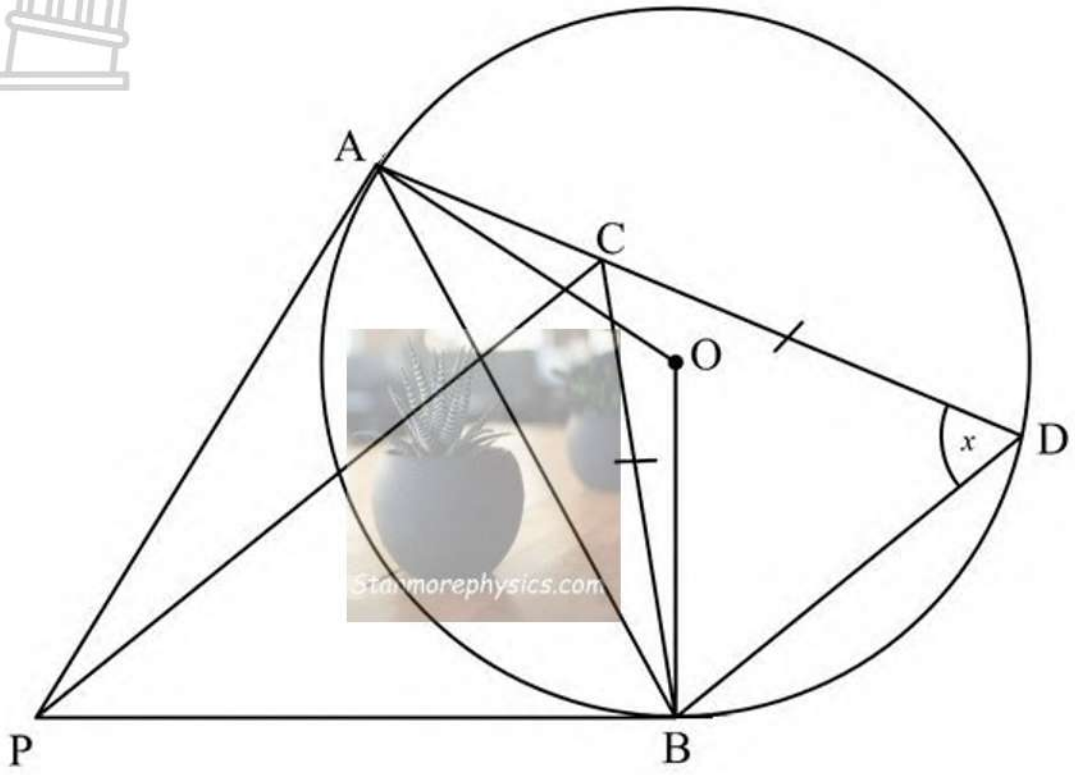
9.2.3 Give a reason why $PS \| QR$. (1)

9.2.4 Hence, prove that TR is a diameter of the circle. (3)

[15]

QUESTION 10

In the diagram below, PA and PB are tangents to the circle with the center O. D lies on the circumference and C is a point on AD such that CD = CB. $\widehat{D} = x$.



10.1 Give the reason why AP = BP. (1)

10.2 What is the size of $P\widehat{A}O$? Give a reason for your answer. (2)

10.3 Prove that AOBP is a cyclic quadrilateral. (2)

10.4 Calculate, with a reason, the size of $A\widehat{O}B$ in terms of x. (2)

10.5 Calculate, with reasons, the size of $A\widehat{C}B$ in terms of x. (3)

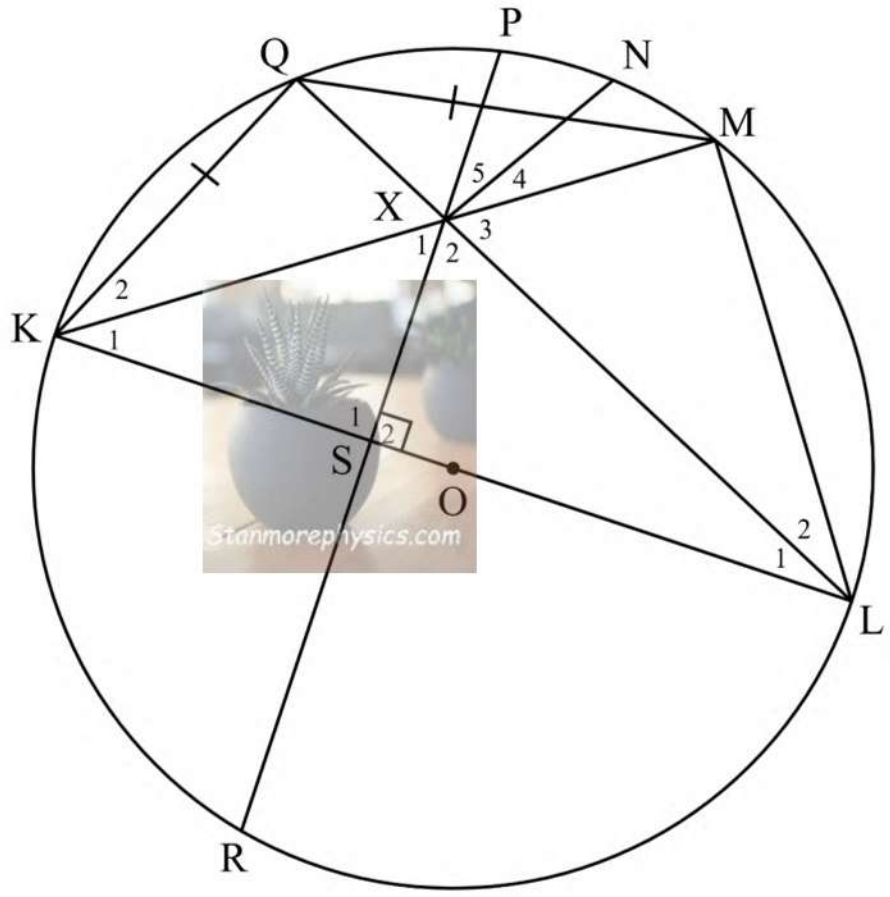
10.6 Prove that ACBP is a cyclic quadrilateral. (4)

10.7 Hence, prove with calculations that PC bisects $A\widehat{C}B$. (4)

[18]

QUESTION 11

In the diagram below, KL is the diameter of a circle with center O. KL = 20 units.
M is a point on the circle such that ML = 12 units. The bisector of $P\widehat{X}M$, line NX meets KM at X. Chord PXR cuts KL perpendicularly at S. Chord KQ = QM.



11.1 Prove that $\widehat{K}_1 = 36{,}87°$, using the necessary calculations and reasons. (3)

11.2 Calculate, with reasons, the size of $\widehat{X}_4$. (3)

11.3 Prove that line NX is a tangent to a circle passing through L, M and X. (5)
[11]

TOTAL: 150

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INFORMATION SHEET: MATHEMATICS GRADE 11

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$A = P(1+ni) \qquad A = P(1-ni) \qquad A = P(1-i)^n \qquad A = P(1+i)^n$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \qquad \text{M}\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c \qquad y - y_1 = m(x - x_1) \qquad m = \frac{y_2 - y_1}{x_2 - x_1} \qquad m = \tan\theta$$

In ΔABC:

$$\frac{a}{\sin \text{A}} = \frac{b}{\sin \text{B}} = \frac{c}{\sin \text{C}}$$

$$a^2 = b^2 + c^2 - 2bc.\cos A$$

$$area\,\Delta ABC = \frac{1}{2}ab.\sin C$$

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$$\bar{x} = \frac{\sum x}{n} \qquad \sigma^2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}$$

$$P(A) = \frac{n(A)}{n(S)} \qquad P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

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