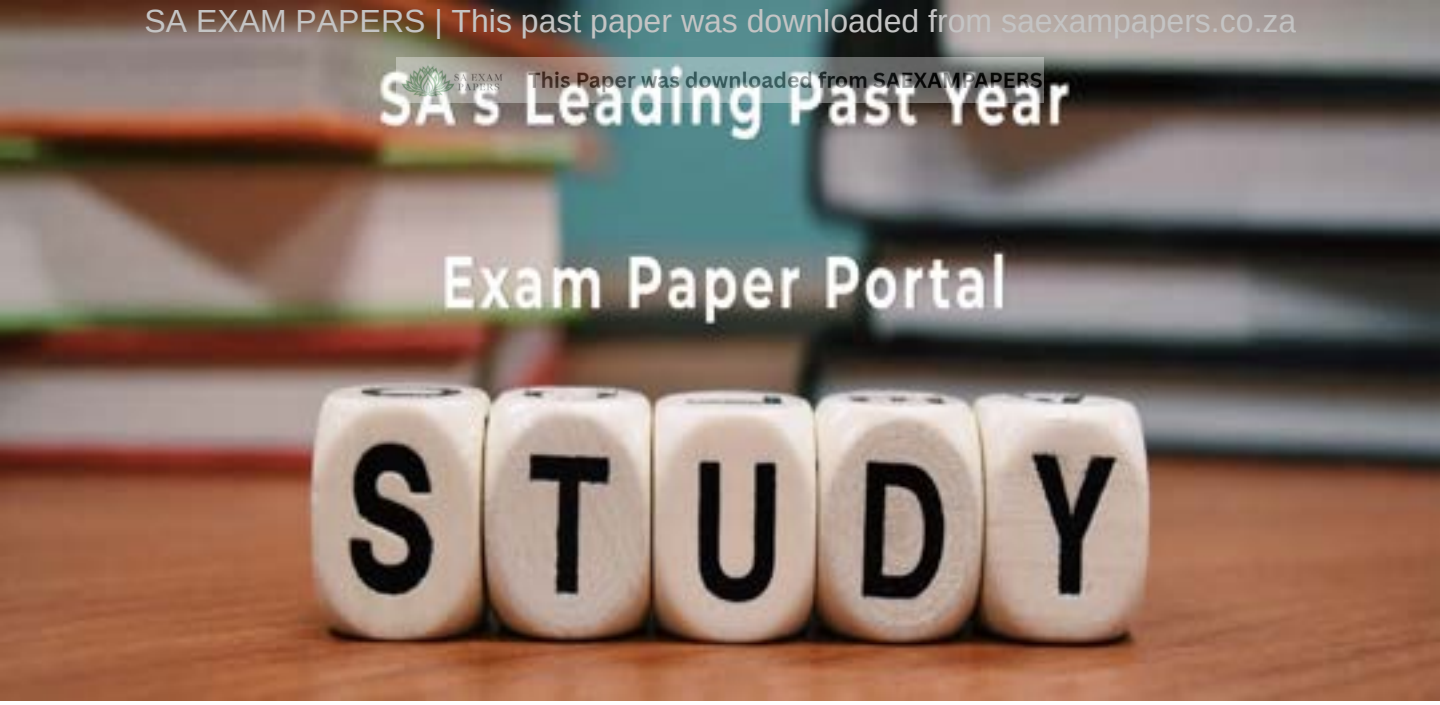


Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Department van Onderwys
Porafensie Ya Kapa Botjahabela: Lefapha la Thuto

NATIONAL SENIOR CERTIFICATE

GRADE 12

JUNE 2026

MATHEMATICS P2

MARKS: **150**

TIME: **3 hours**

This question paper consists of 14 pages, including 1 information sheet and an answer book of 22 pages.

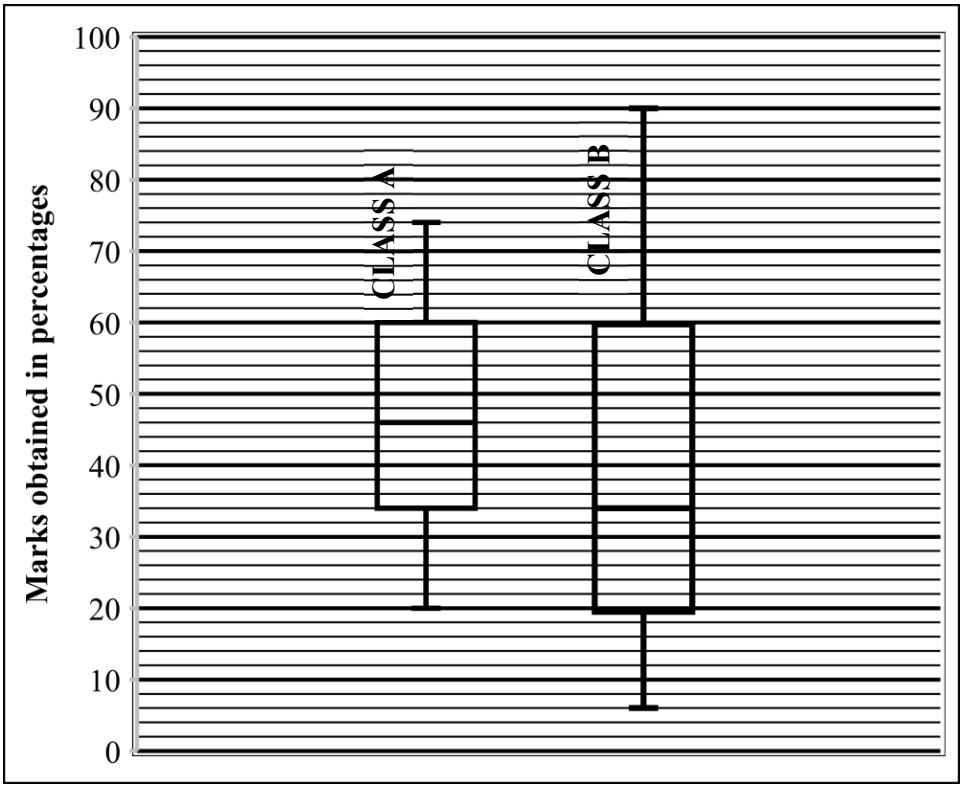
INSTRUCTIONS AND INFORMATION

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 the 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 to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. An information sheet with formulae is included at the end of the question paper.
9. Write neatly and legibly.

QUESTION 1

The box and whisker plot below summarises the results obtained by CLASS A and CLASS B in a certain school.



1.1 Write down the median of **CLASS B**. (1)

1.2 What is common in **CLASS A** and **CLASS B**? (1)

1.3 Write down the range of **CLASS B**. (1)

1.4 Which class performed better between **CLASS A** and **CLASS B**? Justify your answer. (2)

1.5 Which class is having an outlier? (1)

1.6 Comment on the skewness of **CLASS A**. (1)

1.7 In **CLASS A**, 20 learners wrote the test. Learners who performed above 80% were awarded. Determine how many learners qualified for awards. (2)
[9]

QUESTION 2

On a particular day, 28 residents of a certain community went to a health care facility (clinic) for their medication. They were grouped according to their ages as represented in the table below.

2.1 Complete the table below.

Ages in years	Frequency	Cumulative frequency
$10 < x \leq 19$		1
$20 < x \leq 29$		3
$30 < x \leq 39$		6
$40 < x \leq 49$		10
$50 < x \leq 59$		16
$60 < x \leq 69$		23
$70 < x \leq 79$		27
$80 < x \leq 89$		28

(2)

2.2 Estimate the mean for the table above. (3)

2.3 Write down the modal class. (1)

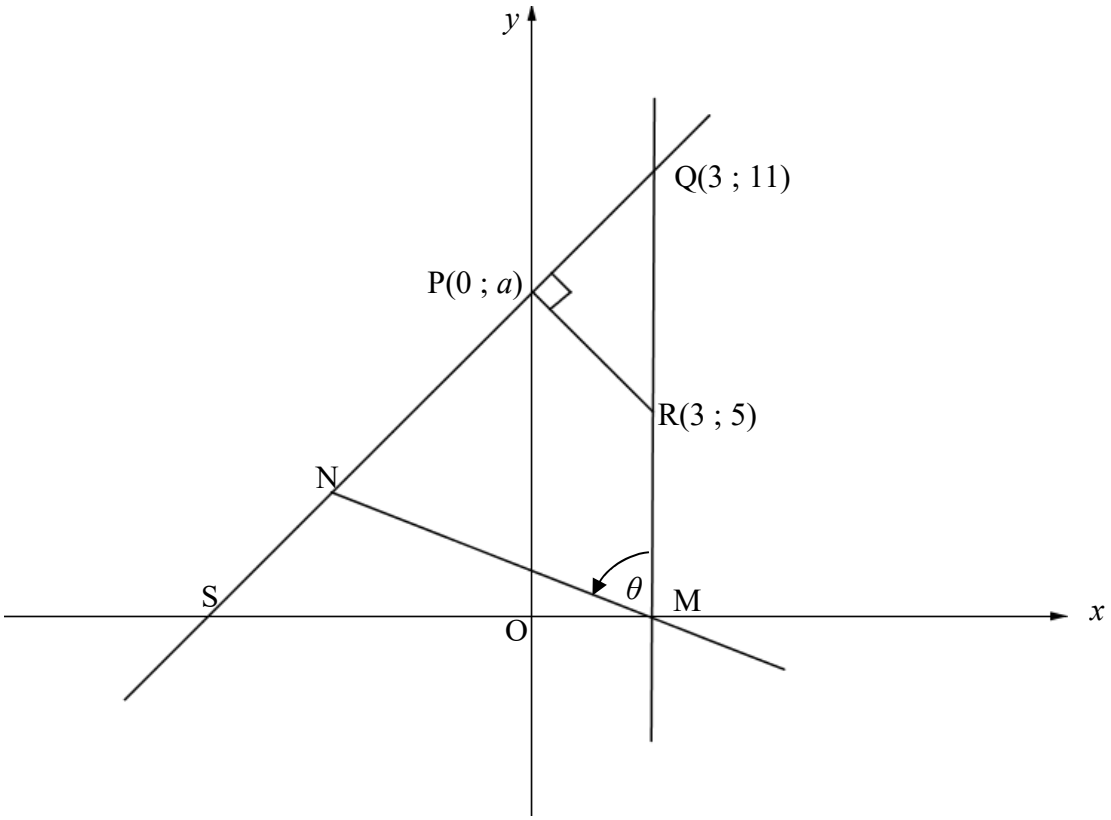
2.4 Sketch the cumulative frequency graph (ogive) from the table above. (3)

2.5 Determine how many people that were above 50 years went to a health care facility (clinic). (1)

[10]

QUESTION 3

In the diagram below, MQ is parallel to the *y*-axis. PR is perpendicular to QS. N lies on QS. MS lie on the *x*-axis. Area of triangle MQN is 45,38 square units.



3.1 Write down the coordinates of M. (1)

3.2 Write down the length of QM. (1)

3.3 Determine the gradient of PQ in terms of *a*. (2)

3.4 Show that the value of $a = 8$. (5)

3.5 Determine the equation of SQ in the form $y = mx + c$ (3)

3.6 Show that ΔSMQ is isosceles. (3)

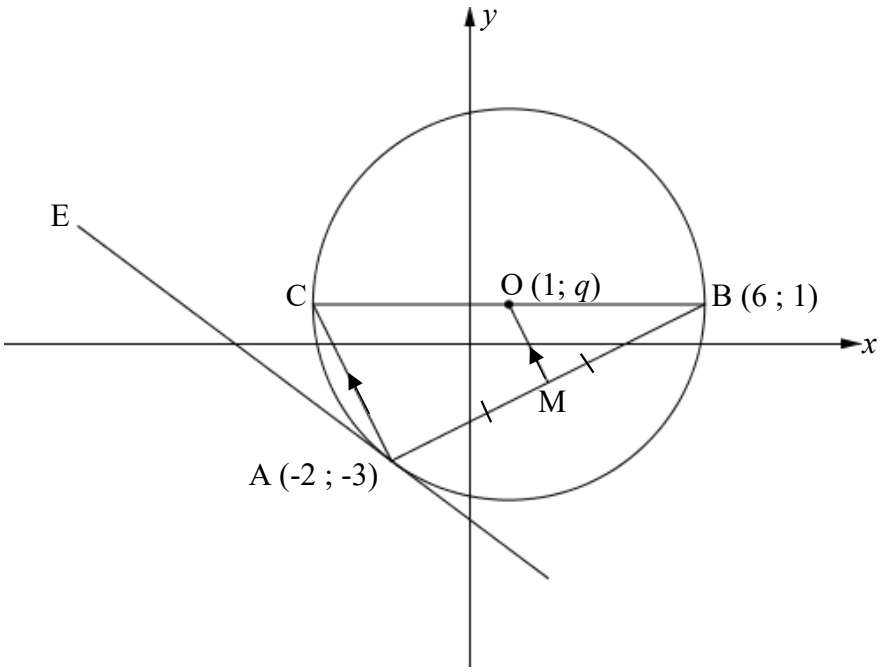
3.7 If it is further given that, $y = mx + 1$ is the equation of MN, determine the size of θ. (4)

3.8 Determine the length of MN. (3)

[22]

QUESTION 4

In the diagram below, O (1; q) is the centre of the circle. M is the midpoint of chord AB. EA is the tangent to the circle at A.



4.1 Calculate the length of AB. (2)

4.2 If it is given that $AC = 2\sqrt{5}$, write down the length of OM. (1)

4.3 Write down the size of $O\hat{M}B$ (1)

4.4 Determine the value of q. (3)

4.5 Calculate gradient of AO if q = 1. (2)

4.6 Determine the equation of the circle with centre O in the form $(x-a)^2+(y-b)^2=r^2$. (2)

4.7 Determine the equation of AE. (3)

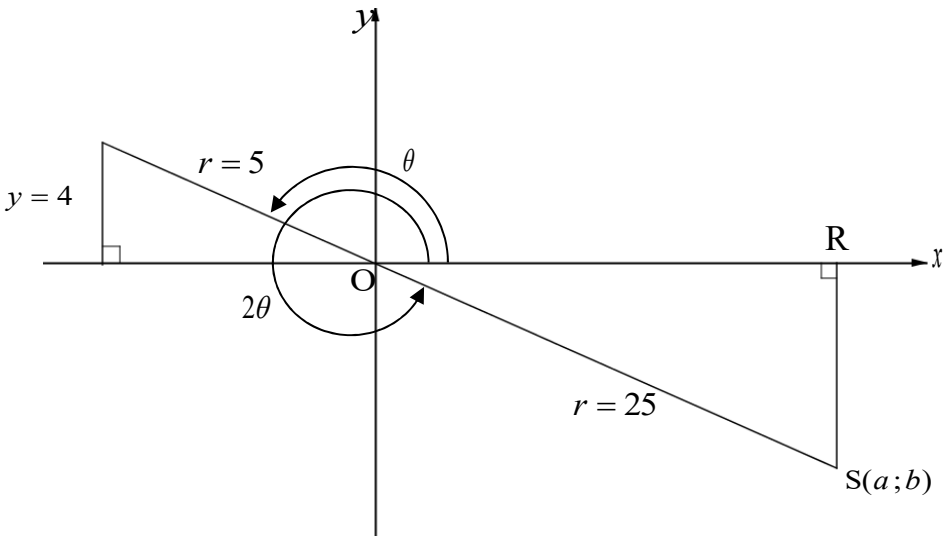
4.8 For which value(s) of t will $y=-\frac{3}{4}x+t$ be a secant to the circle? (2)

4.9 Does $\left(-\frac{22}{3};1\right)$ lie inside or outside the circle? Justify your answer. (3)

[19]

QUESTION 5

In the diagram below, $\sin\theta = \frac{4}{5}$ where $90^\circ < \theta < 180^\circ$ and point S(a ; b) is in the 4th quadrant with reflex angle where $180^\circ < 2\theta < 360^\circ$.



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

5.1.1 $\cos\theta$ (2)

5.1.2 $\cos(90^\circ - \theta)$ (2)

5.1.3 Hence or otherwise, determine the coordinates of S. (5)

5.2 Simplify to one trigonometric ratio of θ.

$$\frac{\cos(\theta - 360^\circ).\sin(180^\circ + \theta)}{\cos^2\theta + \sin\theta\cos(90^\circ + \theta) + \sin^2\theta}$$

(6)
[15]

QUESTION 6

6.1 Given: $\frac{16\sin^2 A.\cos A}{2\sin^3 A - \sin 2A\cos A} = -4\tan 2A$

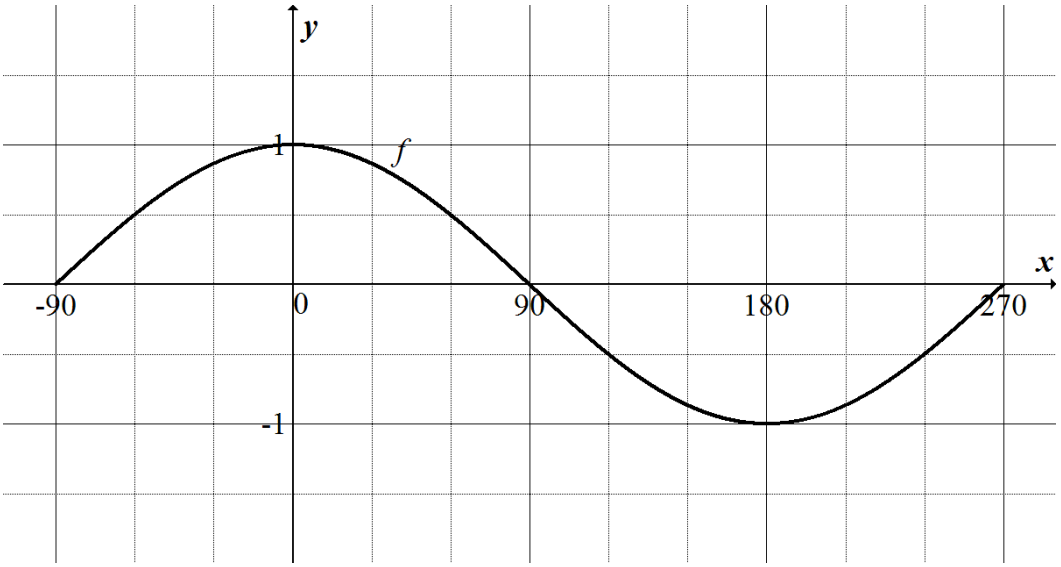
6.1.1 Prove the above identity. (4)

6.1.2 Hence, or otherwise, write down the domain of the above identity in the interval of $A \in [-90^\circ ; 90^\circ]$ (2)

6.2 Determine the general solution of $\sin(30^0 - 2x) = -\sin^2 x + \cos^2 x$ (7)
[13]

QUESTION 7

The graph of $f(x) = \cos x$ is drawn in the interval of $x \in [-90^\circ ; 270^\circ]$.



7.1 Write down the range of $f(x) - 2$. (2)

7.2 On the same set of axes draw the graph of $g(x) = \sin(x - 30^\circ)$ in the interval of $x \in [-90^\circ ; 270^\circ]$ (3)

7.3 For which values of x is:

7.3.1 $f(x) - g(x) = \frac{3}{2}$ (2)

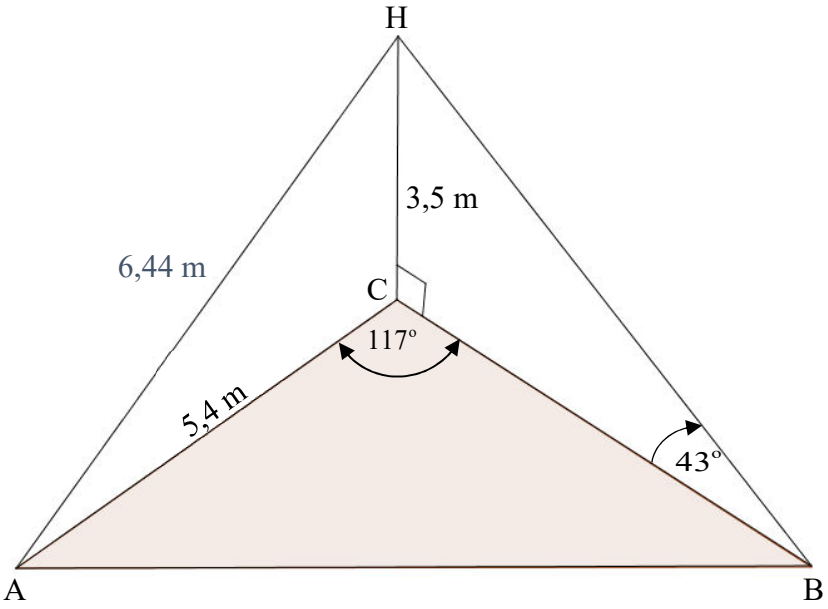
7.3.2 $2 - 4\cos^2 \frac{1}{2}x = \sqrt{3}\sin x - \cos x$ (4)

7.3.3 $f'(x + 10^\circ) < 0$ (2)

[13]

QUESTION 8

In the diagram below, HC is the vertical pole mounted on the ground ACB. $HC = 3{,}5\text{ m}$, $AC = 5{,}4\text{ m}$, $A\hat{C}B = 117°$, $AH = 6{,}44\text{ m}$ and $C\hat{B}H = 43°$.



8.1 Determine the length of BC. (2)

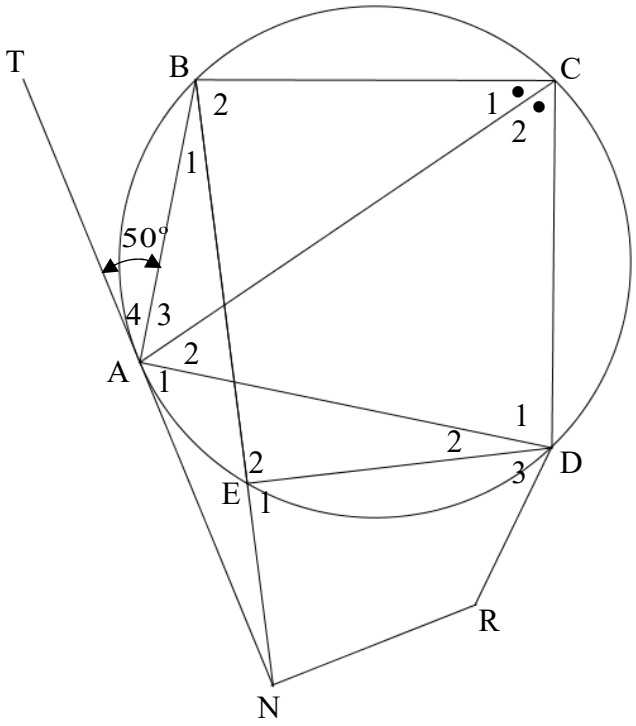
8.2 If it is further given that AB = 7,85; calculate the size of HÂB (5)

8.3 Determine the area of ΔHAB. (3)

[10]

QUESTION 9

In the diagram below, points A, B, C, D and E lie on the circumference of the circle. TAN is a tangent to the circle at point A. $\hat{A}_4 = 50^\circ$ and $\hat{C}_1 = \hat{C}_2$.



9.1 Determine, with reasons, THREE other angles each equal to 50°. (4)

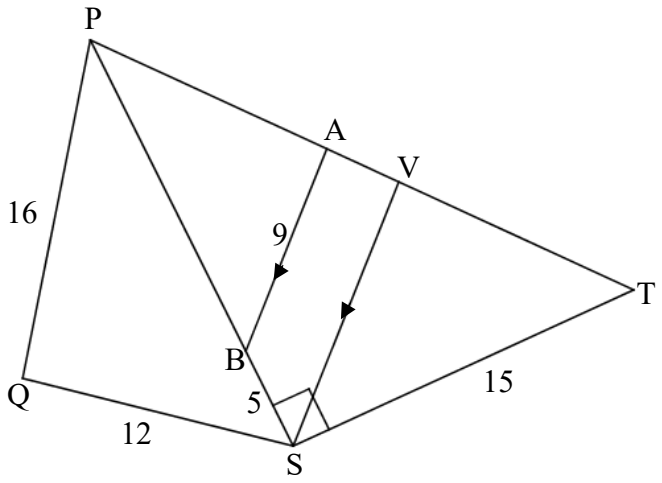
9.2 Prove that point E is the centre of the circle that passes through points A, N, R and D. (4)

9.3 Determine the size of $\hat{R}$. (2)

9.4 Give a reason why AB = AD. (1)
[11]

QUESTION 10

In the diagram below, ΔPQS and ΔPST are drawn. $AB \parallel VS$ and $P\hat{S}T = 90^{\circ}$. $\frac{AV}{PV} = \frac{1}{4}$, PQ = 16 units, ST = 15 units, BS = 5 units, AB = 9 units, QS = 12 units and VT = AB.



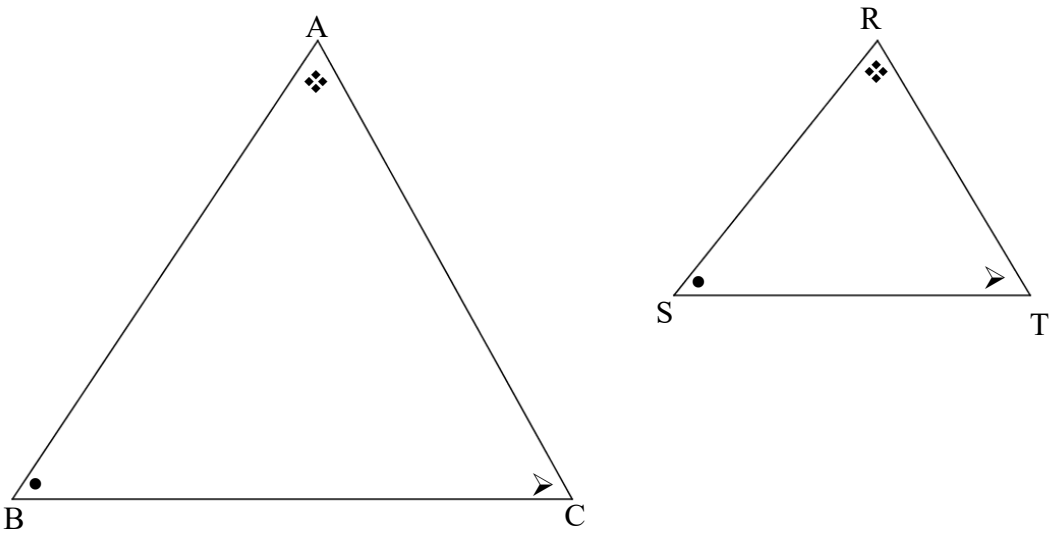
10.1 Determine the length of PB. (3)

10.2 If it is further given that $\Delta PAB \,|||\, \Delta PVS$, prove that $\Delta PQS|||\Delta SVT$. (6)

[9]

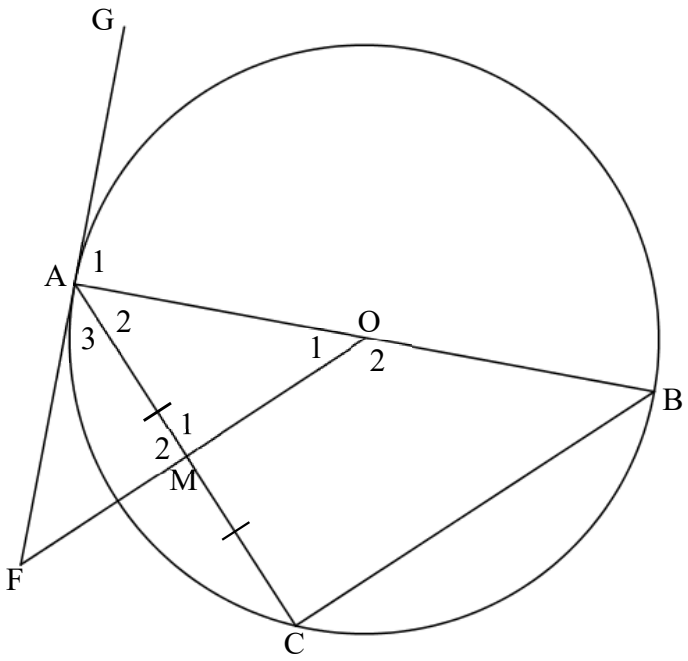
QUESTION 11

11.1 In the diagram below, $\hat{A} = \hat{R}$, $\hat{B} = \hat{S}$ and $\hat{C} = \hat{T}$.
Prove the theorem which states that equiangular triangles have equal ratios, that is:
$\frac{AB}{RS} = \frac{AC}{RT}$.



(6)

11.2 In the diagram below, O is the centre of the circle. GAF is the tangent at A. M is the midpoint of chord AC. CB is a chord. OM is extended to F.



Prove that:

11.2.1 $FO \parallel CB$ (4)

11.2.2 $\Delta MAF \;|||\; \Delta CBA$ (4)

11.2.3 $AB^2 - BC^2 = 2BC \times MF$ (5)

[19]

TOTAL: 150

INFORMATION SHEET: MATHEMATICS

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

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

$$F = \frac{x\left[(1+i)^n - 1\right]}{i} \qquad P = \frac{x\left[1-(1+i)^{-n}\right]}{i}$$

$$T_n = a + (n-1)d \qquad S_n = \frac{n}{2}\left(2a + (n-1)d\right)$$

$$T_n = ar^{n-1} \qquad S_n = \frac{a\left(r^n - 1\right)}{r-1} \;; \quad r \neq 1 \qquad S_\infty = \frac{a}{1-r} \;; \; -1 < r < 1$$

$$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

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

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

$$(x-a)^2 + (y-b)^2 = r^2$$

$$In\ \Delta ABC: \ \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} \qquad a^2 = b^2 + c^2 - 2bc.\cos A \qquad area\,\Delta ABC = \frac{1}{2}ab.\sin C$$

$$\sin(\alpha + \beta) = \sin\alpha.\cos\beta + \cos\alpha.\sin\beta \qquad \sin(\alpha - \beta) = \sin\alpha.\cos\beta - \cos\alpha.\sin\beta$$

$$\cos(\alpha + \beta) = \cos\alpha.\cos\beta - \sin\alpha.\sin\beta \qquad \cos(\alpha - \beta) = \cos\alpha.\cos\beta + \sin\alpha.\sin\beta$$

$$\cos 2\alpha = \begin{cases} \cos^2\alpha - \sin^2\alpha \\ 1 - 2\sin^2\alpha \\ 2\cos^2\alpha - 1 \end{cases} \qquad \sin 2\alpha = 2\sin\alpha.\cos\alpha$$

$$\bar{x} = \frac{\sum x}{n} \qquad \sigma^2 = \frac{\sum_{i=1}^{n}\left(x_i - \bar{x}\right)^2}{n} \qquad P(A) = \frac{n(A)}{n(S)} \qquad P(A\ or\ B) = P(A) + P(B) - P(A\ and\ B)$$

$$\hat{y} = a + bx \qquad b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$