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**MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA**

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MATHEMATICS P2

JUNE 2026

MARKS: 150

TIME: 3 hours

**This question paper consists of 15 pages, 1 information sheet
and the answer book is provided.**



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INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. The 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



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The maximum daily temperatures in $^{\circ}\text{C}$ for Witbank for the first 10 days in July were recorded in the following table.

23	25	22	28	27
20	18	17	24	25

- 1.1 Calculate the mean for this data. (2)
- 1.2 Calculate the standard deviation. (1)
- 1.3 Use the scale line on the ANSWER BOOK to draw a box and whisker diagram to represent the data. (3)
- 1.4 Calculate the number of temperatures that lie outside one standard deviation of the mean. (3)

[9]

QUESTION 2

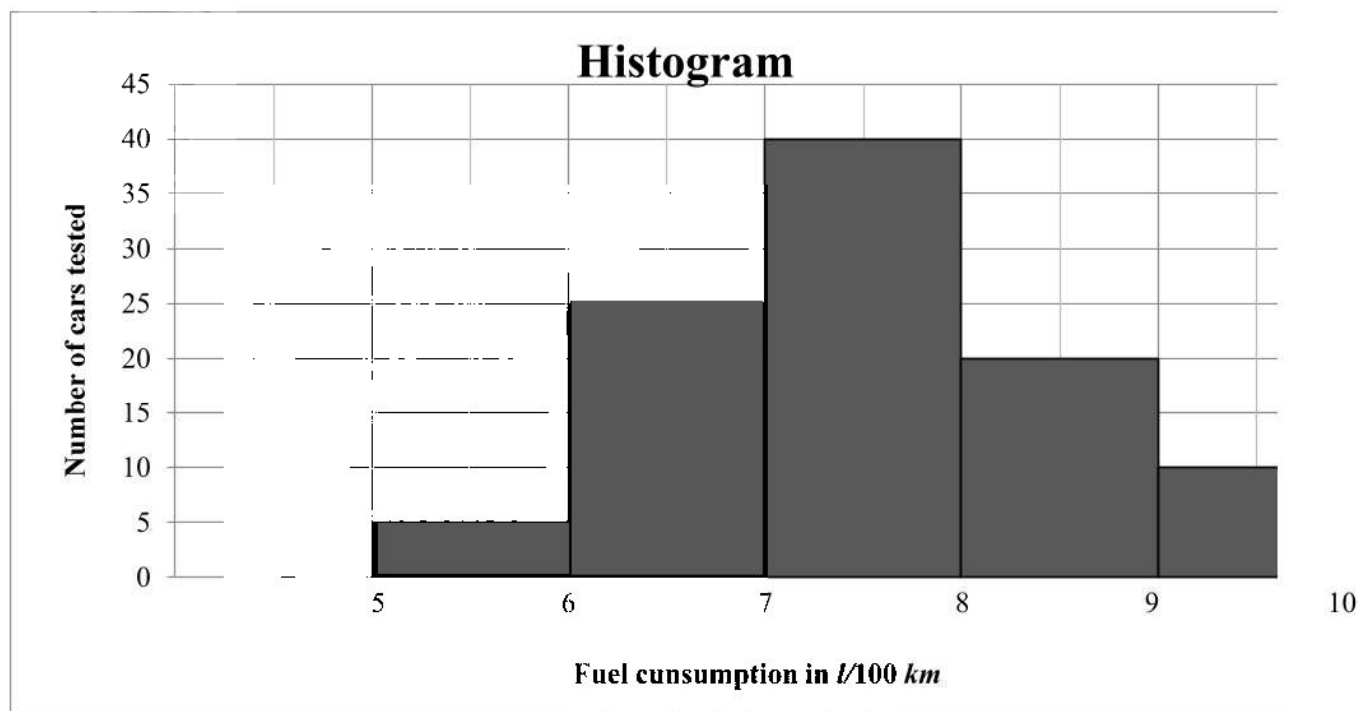


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The fuel consumption of a car is expressed as the number of litres per 100 kilometres (l/100 km) which the car use. The histogram below indicates the results of tests done on different models of a specific car.

A learner conducted a research.



- 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. (3)
- 2.5 Use the ogive to calculate the interquartile range. (3)

[11]

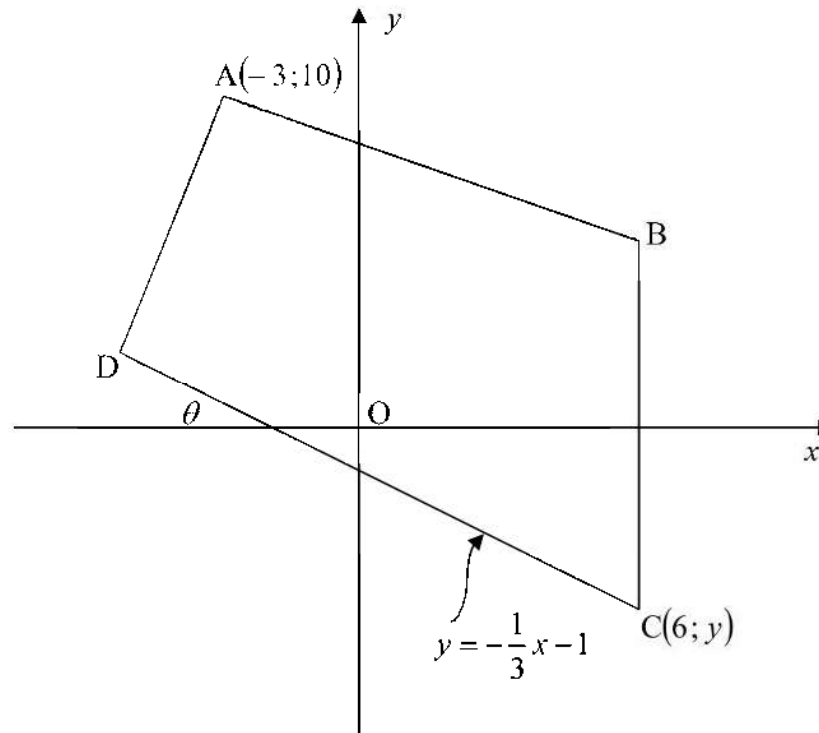
QUESTION 3



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In the diagram below, point $A(-3;10)$ and B in the first quadrant, are points on quadrilateral ABCD. Equation of line DC is given as $y = -\frac{1}{3}x - 1$ and DC form an angle θ with the x -axis as indicated.

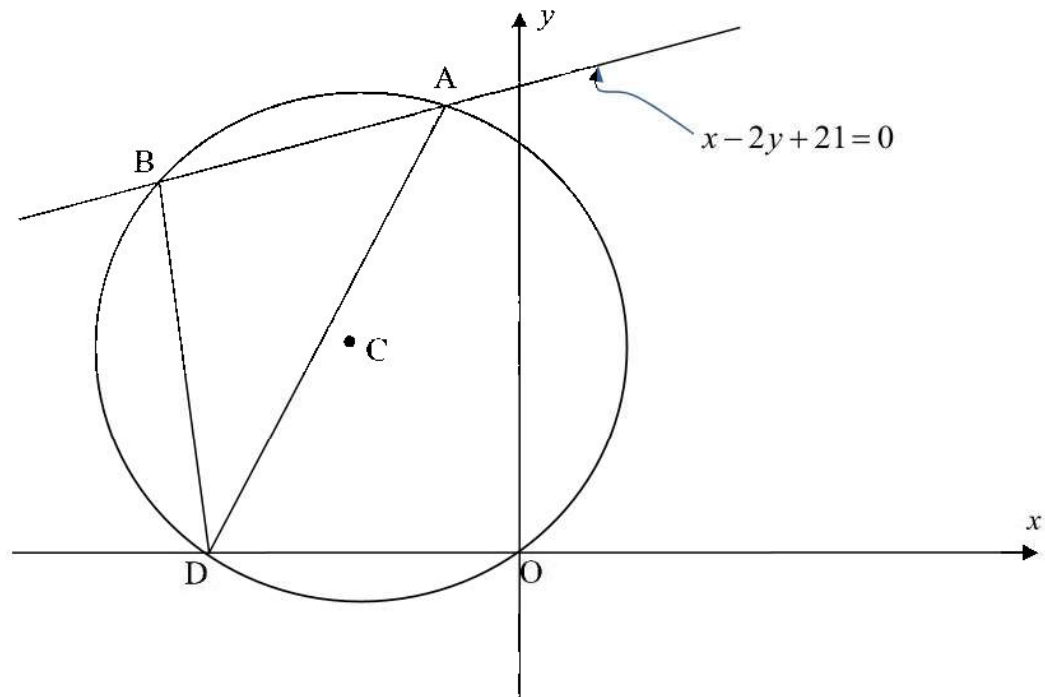


- 3.1 Write down the gradient of DC. (1)
- 3.2 Calculate the size of θ . (2)
- 3.3 Determine the equation of the line AD if $AD \perp DC$. (3)
- 3.4 Determine the y -coordinate of C. (2)
- 3.5 Determine:
 - 3.5.1 The coordinates of D and hence calculate the length of AD. (5)
 - 3.5.2 The area of $\triangle ACD$. (3)
- 3.6 Prove whether quadrilateral ABCD is a parallelogram if it is given that coordinates of $B(6;6)$. Show all necessary calculations. (3)

[19]**QUESTION 4****SA EXAM PAPERS**

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In the diagram below, A, B, D and the origin O lie on the circle with centre C. The equation of the circle is $x^2 + y^2 + 6x - 8y = 0$. The equation of AB is $x - 2y + 21 = 0$.



- 4.1 Determine the coordinates of the centre C, and the radius of the circle. (4)
- 4.2 Determine the coordinates of A and B. (6)
- 4.3 Determine:
- 4.3.1 The midpoint of AD. (5)
- 4.3.2 Whether CB passes through the midpoint of line AD. (4)
- 4.4 A second circle with equation $(x-3)^2 + (y+4)^2 = 25$ is drawn on the same set of axes. A student claims that the circles touch each other in one point. Is the student correct? Show all calculations. (4)

[23]



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**QUESTION 5**

- 5.1 If $\tan p = \frac{5}{12}$ and $90^\circ < p < 270^\circ$ using a diagram and without the use of a calculator, determine the value of :

5.1.1 $\cos 2p$ (4)

5.1.2 $\sin(p - 45^\circ)$ (3)

- 5.2 Given: $\sin(85^\circ + \theta)\cos(25^\circ + \theta) - \cos(85^\circ + \theta)\sin(25^\circ + \theta)$

5.2.1 Simplify without using a calculator. (2)

5.2.2 Hence, determine the general solution of :

$$\sin(85^\circ + \theta)\cos(25^\circ + \theta) - \cos(85^\circ + \theta)\sin(25^\circ + \theta) = -\tan x \quad (4)$$

- 5.3 Simplify without using a calculator:

$$\tan(-\theta) \cdot \sin(90^\circ + \theta) + \frac{\sin 2\theta}{2\cos(360^\circ + \theta)} \quad (6)$$

[19]
|



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**QUESTION 6**

6.1 Given: $\frac{\cos^4 x + \sin^2 x \cdot \cos^2 x}{1 + \sin x} = 1 - \sin x$

6.1.1 Prove the identity. (4)

6.1.2 For which values of x in the interval $x \in [0^\circ; 360^\circ]$ is the identity undefined? (2)

6.1.3 Write down the minimum value of the function defined by (2)

$$y = \frac{\cos^4 x + \sin^2 x \cdot \cos^2 x}{1 + \sin x}$$

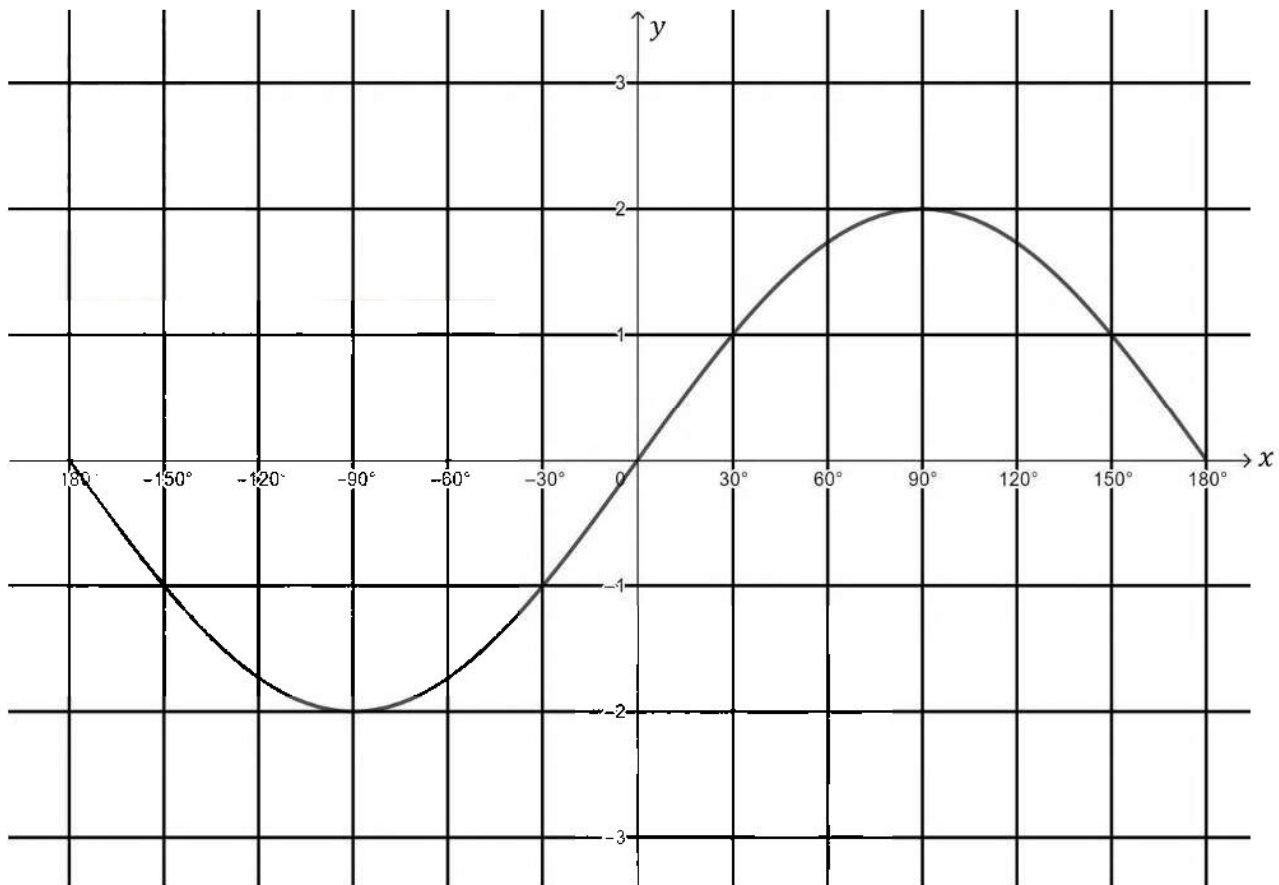
6.2 Given that $\sin \theta = \frac{1}{3}$, calculate the numerical value of $\sin 3\theta$, WITHOUT using a calculator. (5)

[13]**SA EXAM PAPERS**

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**QUESTION 7**

The sketch below is the graph $f(x) = 2 \sin x$ for $x \in [-180^\circ; 180^\circ]$.



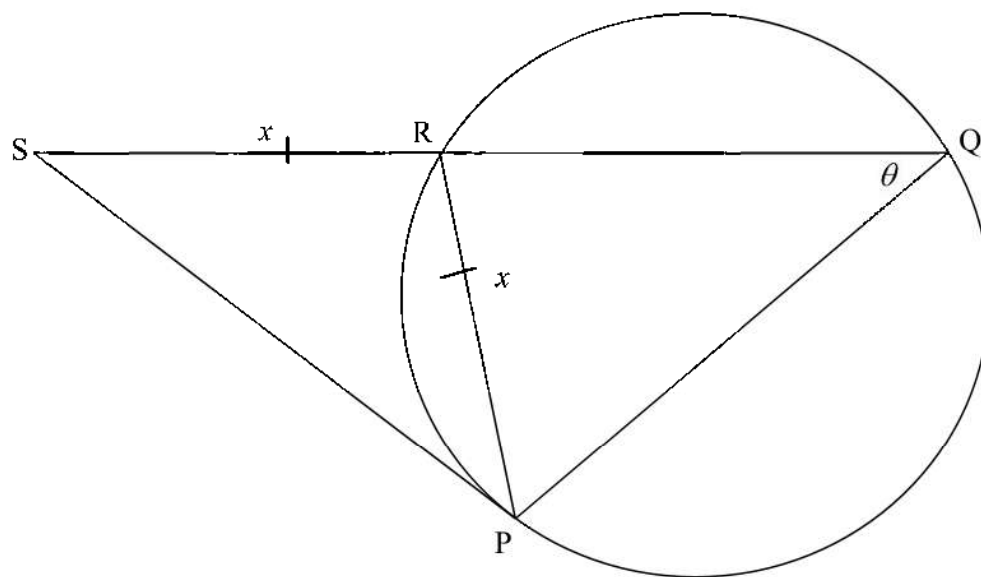
- 7.1 Write down the period of f . (1)
- 7.2 Sketch the graph of $g(x) = \cos(x + 30^\circ)$ for $x \in [-180^\circ; 180^\circ]$ on the same set of axes with the graph of f IN THE ANSWER BOOK. (3)
- 7.3 If $h(x) = \sin x$, state the translation from g to h . (2)
- 7.4 Use the sketched graphs to answer the question. For which values of x is
- 7.4.1 $f(x) \geq g(x)$, if $f(x)$ and $g(x)$ intersect at $x = 19,11^\circ$ and $x = -160,89^\circ$ (2)
- 7.4.2 $f(x) \cdot g'(x) > 0$? if $x \in [-180^\circ; 0^\circ]$ (2)
- [10]**

**QUESTION 8**



In the diagram below, PS is a tangent to the circle through P, Q and R. QRS is a straight line.

$PR = RS = x$ and $\hat{PQR} = \theta$.



Prove that $PS = 2x \cos \theta$

[6]



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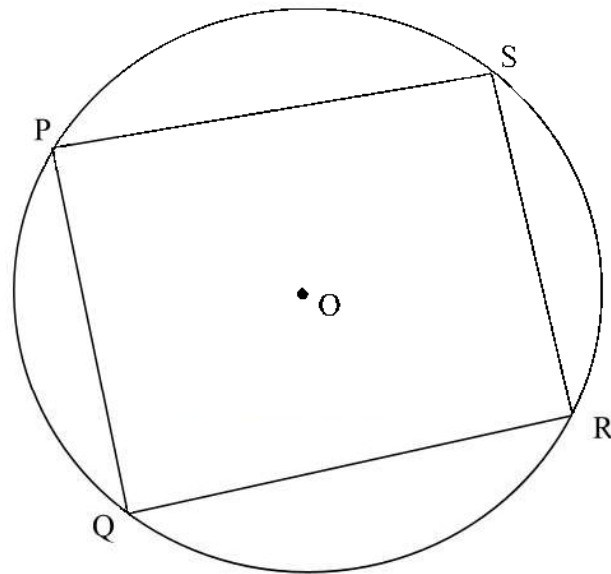
Give reasons for your statements and calculations in QUESTIONS 9, 10 and 11.

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QUESTION 9

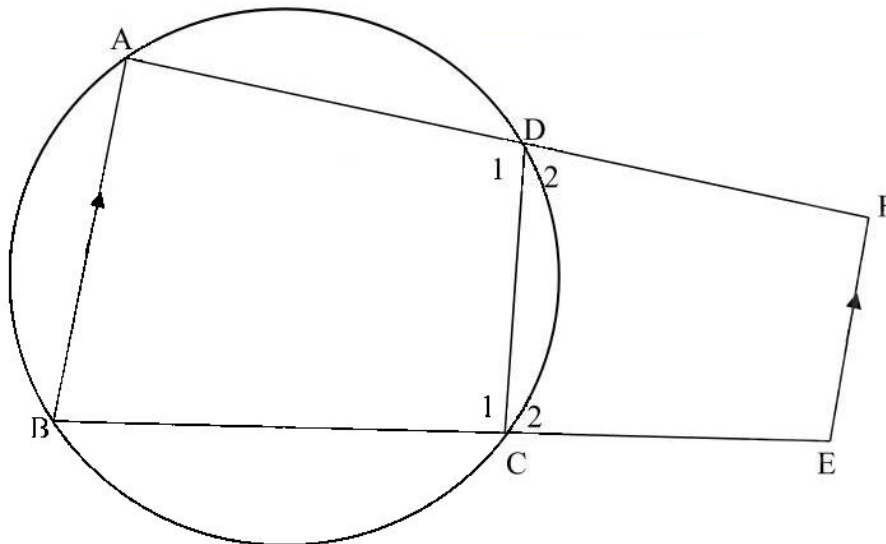
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9.1 In the diagram, PQRS is a cyclic quadrilateral and the circle has centre O.



Prove the theorem which states that $\hat{P} + \hat{R} = 180^\circ$ (5)

9.2 In the diagram below, ABCD is a cyclic quadrilateral. Chords AD and BC are produced to F and E respectively. F and E are joined such that $EF \parallel AB$.

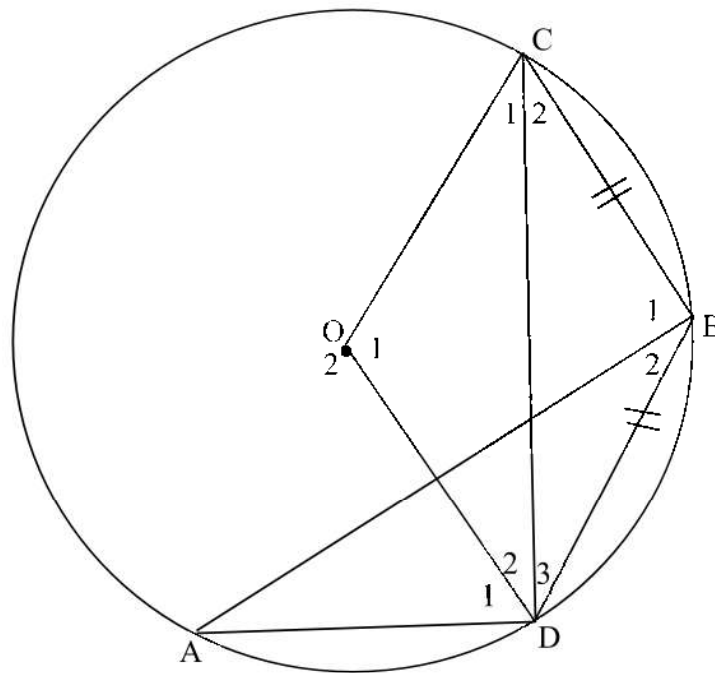


Prove that CEFD is a cyclic quadrilateral. (5)

[10]**QUESTION 10****SA EXAM PAPERS**

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10.1 In the diagram below, A, D, B and C lie on the circle with centre O. $DB = BC$.



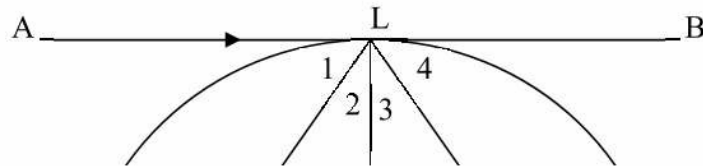
- 10.1.1 If $\hat{A} = x$, state with reasons, two other angles equal to x . (4)
- 10.1.2 Given $\hat{O}_1 = 94^\circ$
- a) Determine $\hat{D}_2$. (3)
- b) Determine $\hat{B}_1 + \hat{B}_2$. (4)
- c) Hence or otherwise determine the value of x . (2)





10.2 AB is a tangent to circle LMNP, $AB \parallel MP$.

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Prove that:

10.2.1 $LM = LP$ (4)

10.2.2 LN bisects $\hat{MNP}$. (4)

10.2.3 LM is a tangent to circle passing through MNQ. (2)

[23]

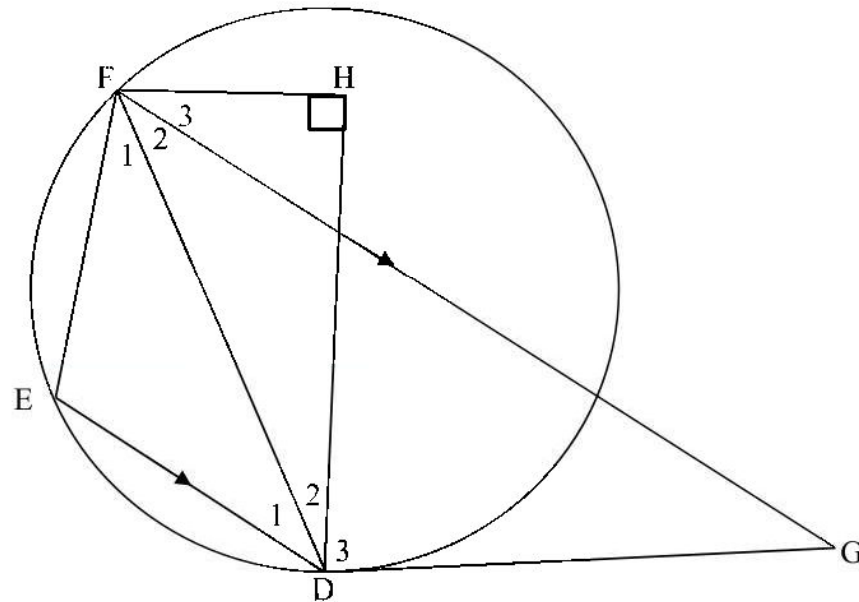


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**QUESTION 11**

In the diagram below, a circle passing through F, E and D is drawn. G is a point outside the circle so that $FG \parallel ED$ and DG is a tangent to the circle at D. H is a point inside the circle with $\widehat{FHD} = 90^\circ$.



11.1 Prove that $\triangle FED \parallel \triangle GDF$ (4)

11.2 Show that $FH^2 + HD^2 = ED \cdot GF$ (3)

[7]

TOTAL: 150



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INFORMATION SHEET

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

$$A = P(1 + ni) \quad A = P(1 - ni)$$

$$T_n = a + (n - 1)d$$

$$T_n = ar^{n-1}$$

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

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

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$y = mx + c \quad y - y_1 = m(x - x_1)$$

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

$$\text{In } \triangle ABC: \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

$$\text{area } \triangle ABC = \frac{1}{2} ab \cdot \sin C$$

$$\sin(\alpha + \beta) = \sin \alpha \cdot \cos \beta + \cos \alpha \cdot \sin \beta$$

$$\cos(\alpha + \beta) = \cos \alpha \cdot \cos \beta - \sin \alpha \sin \beta$$

$$\cos 2\alpha = \cos^2 \alpha - \sin^2 \alpha$$

$$= 1 - 2\sin^2 \alpha$$

$$= 2\cos^2 \alpha - 1$$

$$\bar{x} = \frac{\sum fx}{n}$$

$$P(A) = \frac{n(A)}{n(S)}$$

$$\hat{y} = a + bx$$

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

$$S_n = \frac{n}{2} [2a + (n - 1)d]$$

$$S_n = \frac{a(r^n - 1)}{r - 1}; r \neq 1$$

$$S_\infty = \frac{a}{1 - r}; -1 < r < 1$$

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

$$M\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad m = \tan \theta$$

$$\sin(\alpha - \beta) = \sin \alpha \cdot \cos \beta - \cos \alpha \cdot \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cdot \cos \beta + \sin \alpha \sin \beta$$

$$\sin 2\alpha = 2 \sin \alpha \cos \alpha$$

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

$$P(A \text{ of } B) = P(A) + P(B) - P(A \text{ en } B)$$

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$



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