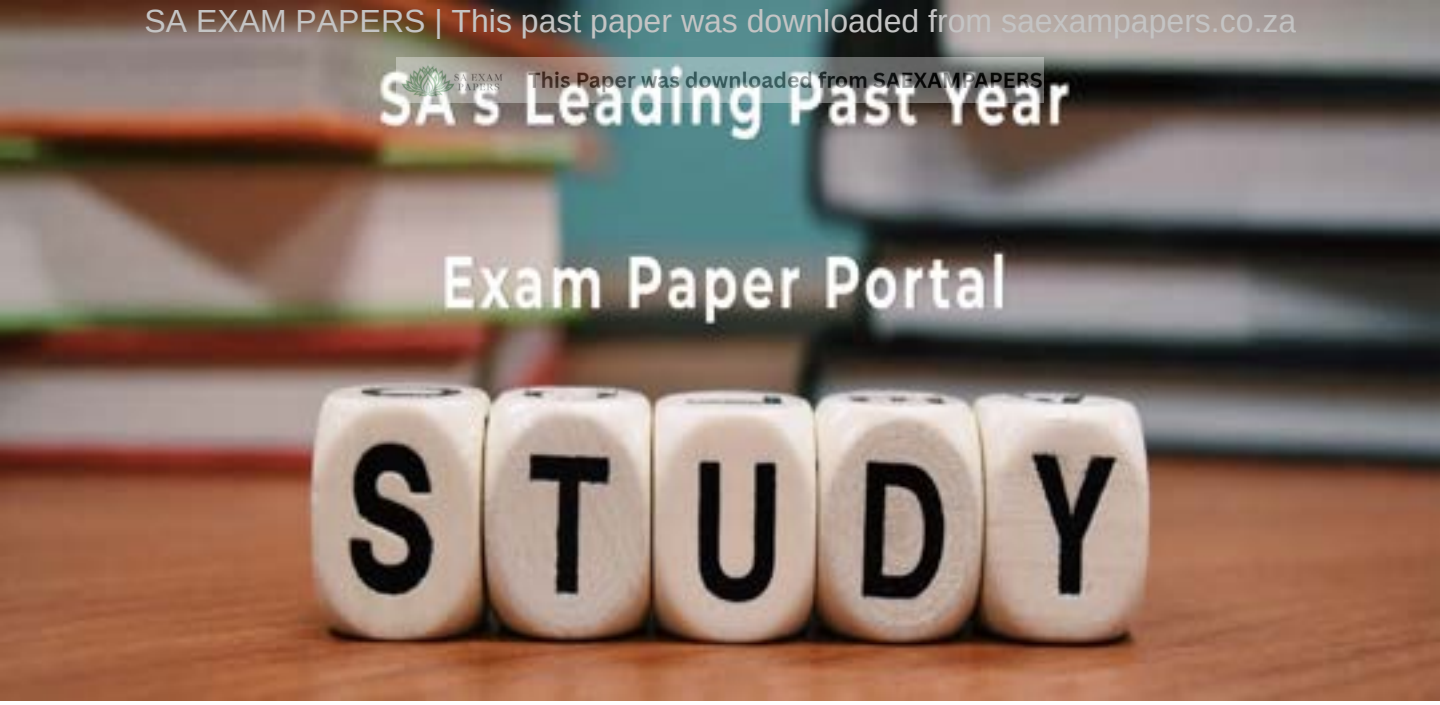


Northern Cape Department of Education

AS WRITTEN 8 JUNE 2026 ERRATA AT 4.1 AND 11.3.5 NOT COMMUNICATED TO CANDIDATES

CURRICULUM PROVINCIAL QUESTION PAPER

GRADE 12

MATHEMATICS

PAPER 2

JUNE 2026

MARKS: 150

TIME: 3 hours

This question paper consists of 12 pages, 1 information sheet and an ANSWER BOOK of 23 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions and information 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. that 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 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 data set below has an average of 26,93.

8	10	17	19	22	24	27	28	29	30
32	35	37	41	45					

1.1 Determine the standard deviation of the data set. (2)

1.2 Determine what percentage of the data points are inside one standard deviation from the mean. (3)

1.3 Calculate the interquartile range. (3)

1.4 If each data point is reduced by 5, write down the new value of:

1.4.1 The average (mean) (1)

1.4.2 The standard deviation (1)

[10]

QUESTION 2

The cumulative frequency table below shows the distances, in kilometres, covered in an ultra-marathon by 51 participants who did not finish the race.

DISTANCE (in km)	FREQUENCY f	CUMULATIVE FREQUENCY
$0 < x \leq 10$	1	1
$10 < x \leq 20$	6	7
$20 < x \leq 30$	**A**	19
$30 < x \leq 40$	16	35
$40 < x \leq 50$	10	45
$50 < x \leq 60$	4	49
$60 < x \leq 70$	2	51

2.1 Write down the value of A. (1)

2.2 Calculate the estimated mean of the data. (2)

2.3 Draw an ogive (cumulative frequency graph) of the data. (4)

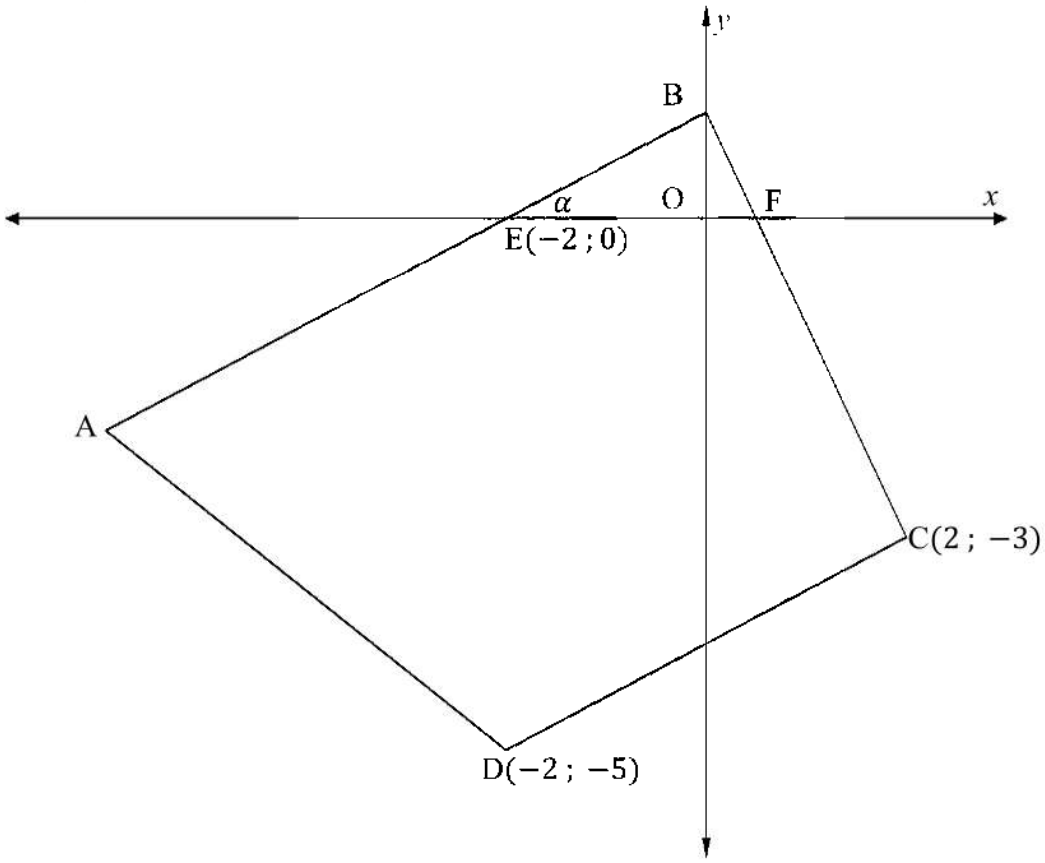
2.4 Read the median from the drawn ogive. (1)

2.5 Determine, from your ogive, how many of the athletes who did not finish, ran further than 55 km. (2)

[10]

QUESTION 3

The diagram below shows a trapezium with vertices A, B, C(2 ; −3) and D(−2 ; −5). AB and CD are parallel. E(−2 ; 0) is the x-intercept of AB and α is the angle of inclination of AB. The gradient of BC = −2.



3.1 Determine the gradient of DC. (2)

3.2 Determine the equation of AB in the form $y = mx + c$. (3)

3.3 Determine the size of α, the angle of inclination of AB. (2)

3.4 Calculate the length of BE. (2)

3.5 Show that $A\widehat{B}C = 90°$. (2)

3.6 Describe the transformation that must be applied from D to D' so that ABCD' will be a parallelogram. The coordinates of A is given as (−6 ; −2). (4)

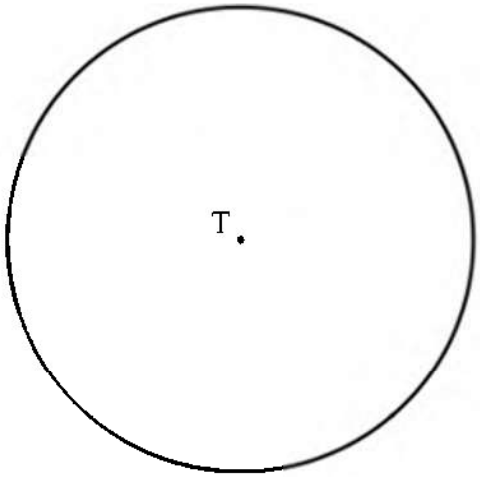
3.7 Hence, or otherwise, determine the point of intersection of the diagonals of the newly formed parallelogram. (3)

3.8 Determine the area of ΔBEF. (3)
[21]

NB: +4 OMITTED FROM LHS OF EQUATION. NOT COMMUNICATED AS ERRATA TO CANDIDATES

QUESTION 4

In the diagram, the equation $x^2 + y^2 + 4x - 12y \overset{+4}{=} 0$ describes the circle with centre T and radius r.



+4

4.1 Write $x^2 + y^2 + 4x - 12y = 0$ in the form $(x-a)^2 + (y-b)^2 = r^2$ to show that the coordinates of the centre T is $(-2\,;6)$ and the length of the radius r is equal to 6. (3)

4.2 Hence, write down the coordinate(s) of the x-intercept(s). (1)

4.3 Calculate the coordinates of the y-intercepts. Leave your answer in simplified surd form. (4)

4.4 Calculate the equation of the tangent to the circle at $\left(0\,;6+4\sqrt{2}\right)$. (4)

4.5 For which values of k, $k \in R$, will a circle with centre $(-2\,;6+k)$ and radius 6, not touch or intersect the x-axis? (4)

[16]

QUESTION 5

5.1 Prove that: $\dfrac{-1+\cos(180°-\theta)\,.\,-\cos\theta}{\cos(-\theta)\,.\cos\theta\,.\tan^2(540°+\theta)} = -1$ (6)

5.2 If $\sin 40° = k$, express the following in terms of k:

5.2.1 $\dfrac{1}{\sin 140°}$ (2)

5.2.2 $\sin 20° \cos 20°$ (2)

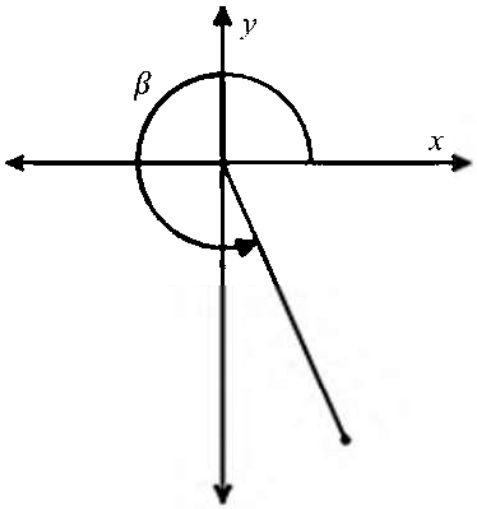
5.2.3 $\sin 20°$ (Leave your answer in simplified surd form) (4)

5.3 If $\sin 76° = a$ and $\cos 76° = b$, show, without the use of a calculator, that $a^2 - b^2 = \cos 28°$. (3)

[17]

QUESTION 6

6.1 Given: $\tan\beta = -\frac{4}{3}$ with $180° < \beta < 360°$



Determine, without the use of a calculator and with the aid of diagrams, the value of:

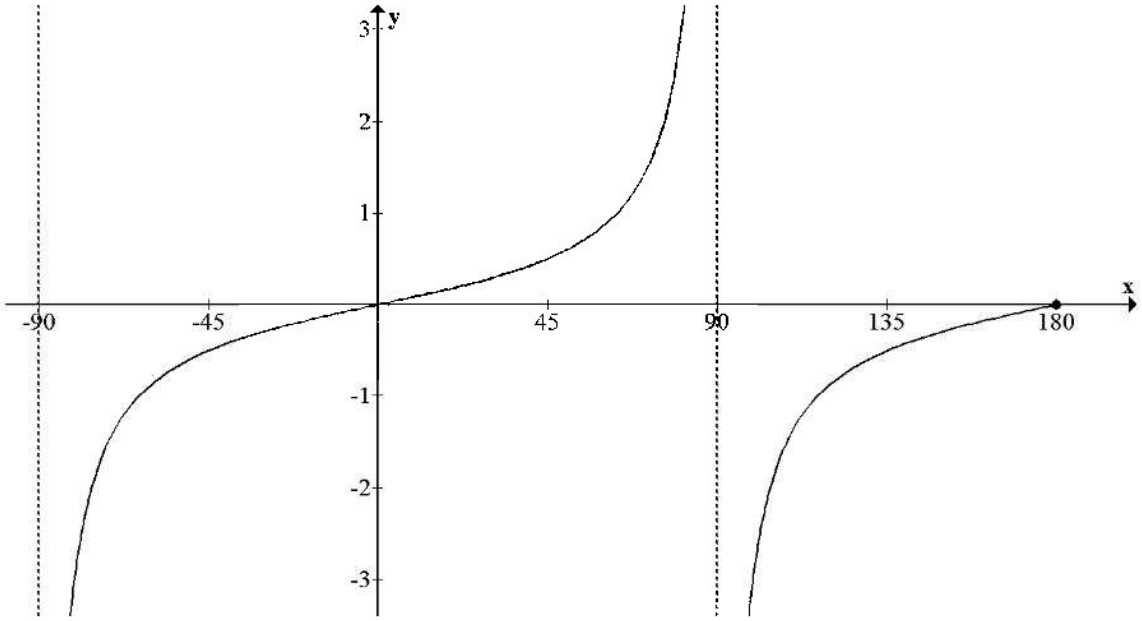
6.1.1 $\sin\beta$ (2)

6.1.2 $\sin(\beta + \alpha)$ if $\sin\alpha = -\frac{4}{5}$ with $0° < \alpha < 270°$ (3)

6.2 Determine the general solution of $\sin x\,(3\sin x + 1) = 0$. (5)
[10]

QUESTION 7

In the diagram, the graph of $f(x) = \frac{1}{2}\tan x$ is drawn for $x \in [-90° ; 180°]$.



7.1 For which value(s) of x is $f(x) = 0$ in the interval $x \in [-90° ; 180°]$? (1)

7.2 On the set of axes provided in the ANSWER BOOK, draw the graph of $g(x) = \sin 2x$ for $x \in [-90° ; 180°]$. Clearly indicate all turning points and intercepts with the axes. (3)

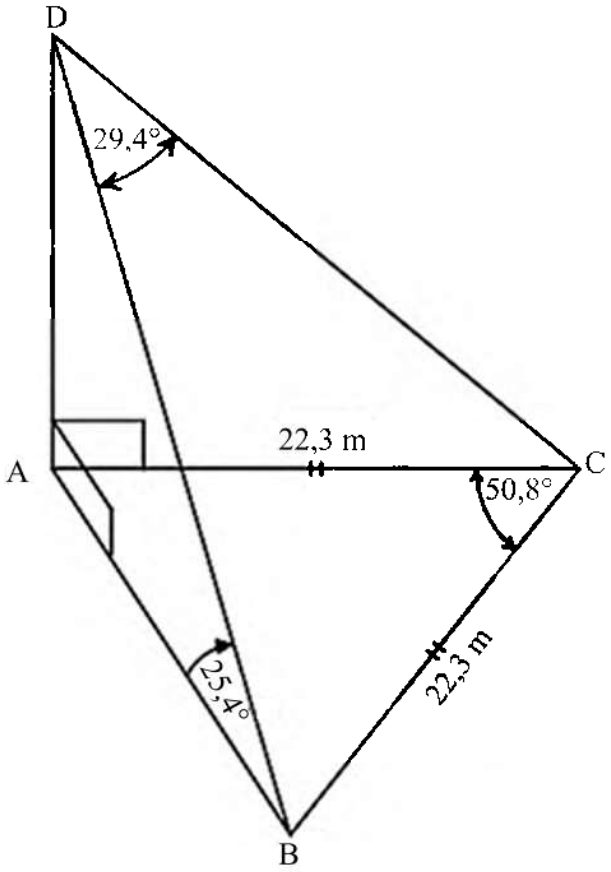
7.3 Determine the value(s) of x for which $\frac{1}{2}\tan x = \sin 2x$ in the interval $x \in [-90° ; 180°]$. Show ALL calculations. (7)

7.4 Hence, or otherwise, determine the value(s) of x in the interval $x \in [0° ; 90°]$ for which $\frac{1}{2}\tan x - 2\sin x \cos x \geq 0$ (3)

[14]

QUESTION 8

In the diagram, A, B and C are three points in the same horizontal plane.
AC = BC = 22,3 m
AD is a vertical tower anchored by cables at B and C.
The angle of elevation from B to D is 25,4°
$B\hat{D}C = 29,4°$ and $B\hat{C}A = 50,8°$



Calculate, correct to TWO decimal places:

8.1 The area of ΔABC (2)

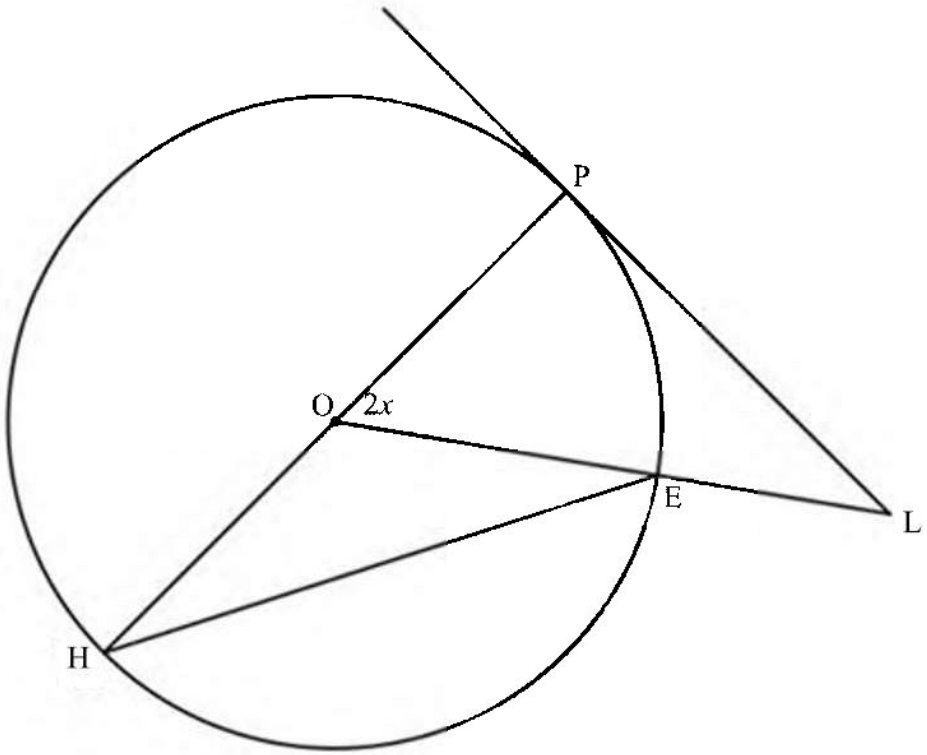
8.2 The length of AB (3)

8.3 The length of DC if $D\hat{B}C = 43,6°$ (2)
[7]

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

QUESTION 9

In the diagram, O is the centre of the circle. HOP is a diameter and LP is a tangent to the circle at P. OL intersects the circle at E.



Calculate, with reasons, the size of the following in terms of x:

9.1 HÊO (4)

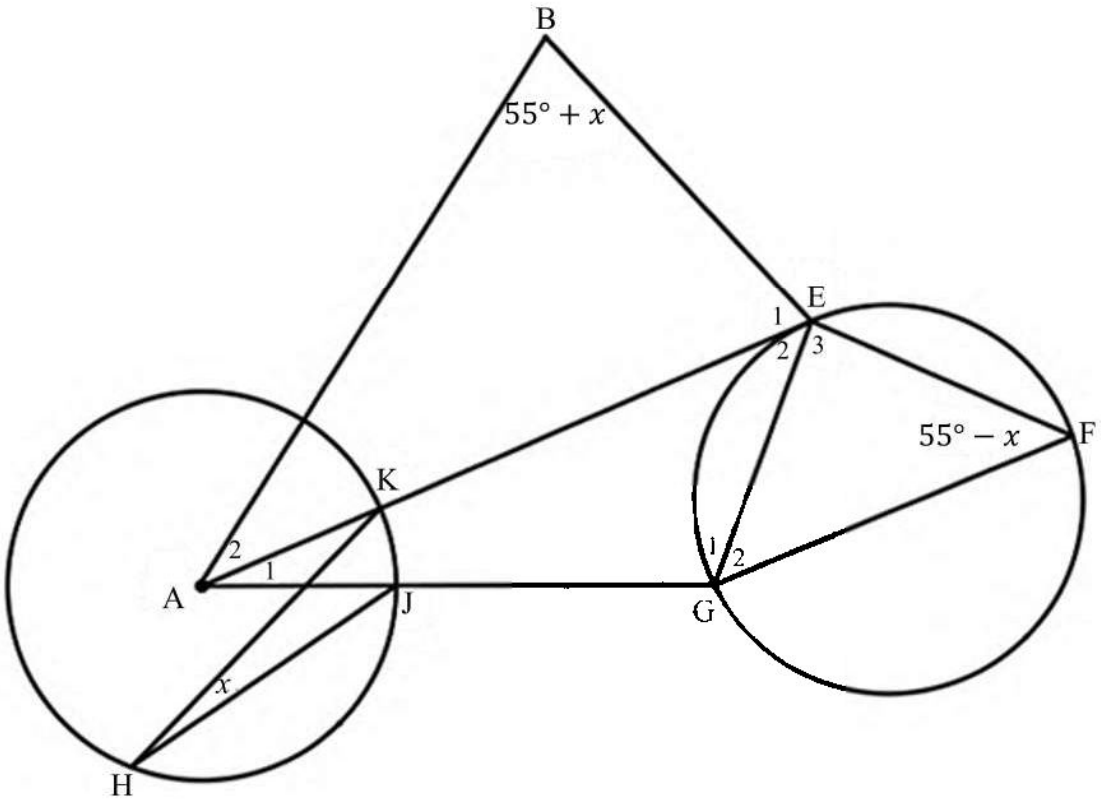
9.2 $\hat{L}$ (3)

[7]

QUESTION 10

In the circle with centre A, the points H, J and K are on the circumference of the circle. Another circle passes through the coordinates of G, E and F. AE is a tangent at E and intersects the first circle at K.

$\hat{H} = x$, $\hat{F} = 55° - x$ and $\hat{B} = 55° + x$

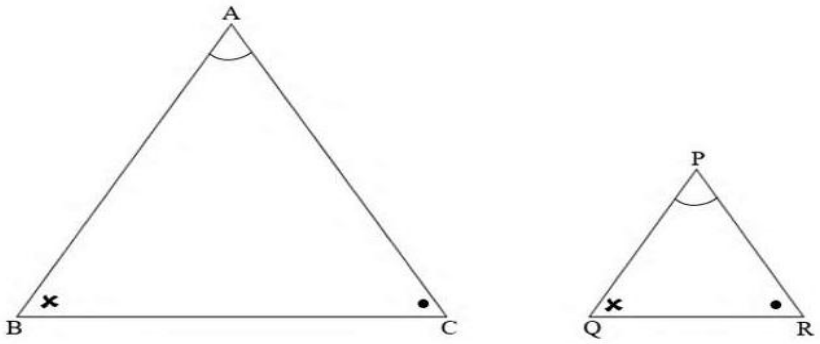


10.1 Calculate, with reasons, the size of $\hat{E}_2$ in terms of x. (2)

10.2 Prove that ABEG is a cyclic quadrilateral. (5)
[7]

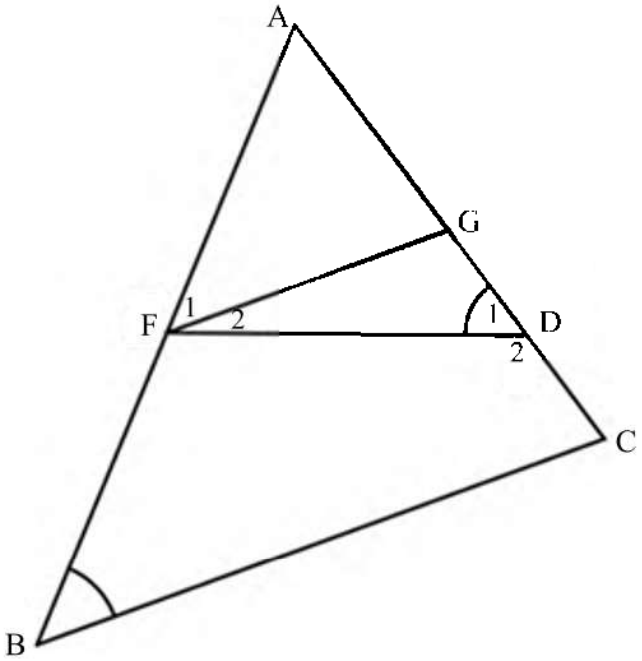
QUESTION 11

11.1 Use the diagram provided in the ANSWER BOOK to answer the following question.



Prove the theorem which states that if two triangles are equiangular, then the corresponding sides are in proportion, i.e. $\frac{AB}{PQ} = \frac{AC}{PR}$ (6)

11.2 In ΔABC, F and G are points on sides AB and AC respectively. D is a point on GC such that $\hat{D}_1 = \hat{B}$.



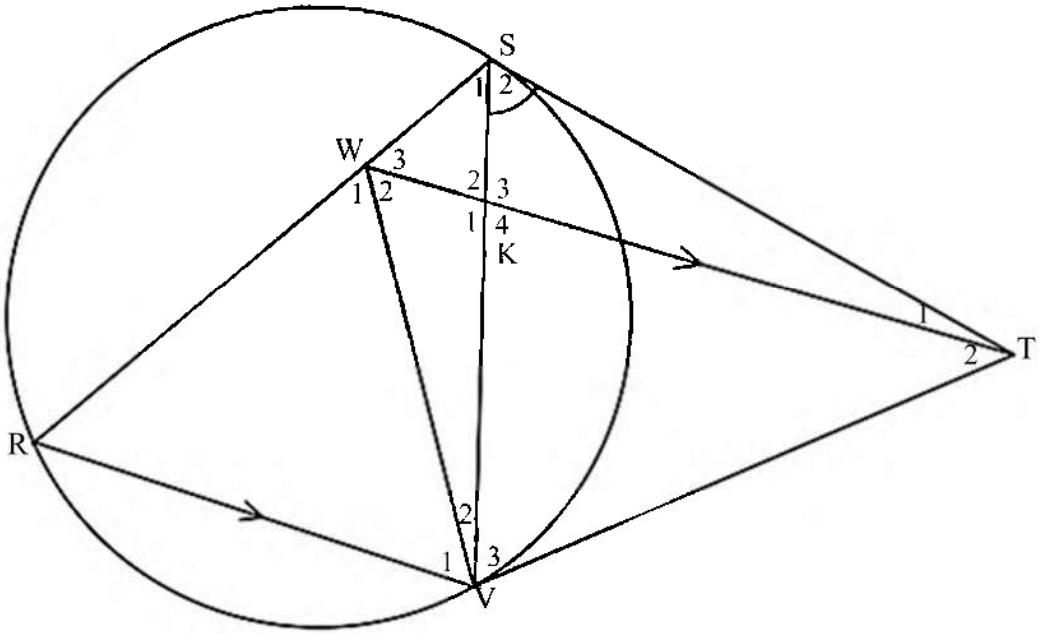
11.2.1 AF is a tangent to the circle through points F, G and D. Prove, with reasons, that FG||BC. (3)

11.2.2 If $\frac{AF}{AB} = \frac{2}{5}$, $AC = 2k - 6$ and $GC = k + 9$, calculate the value of k. (5)

11.2.3 Calculate:

$$\frac{\text{Area of } \Delta AFG}{\text{Area of } \Delta ABC}$$ (3)

11.3 In the diagram, ST and TV are tangents to the circle at S and V respectively. R is a point on the circle and W is a point on chord RS such that TW is parallel to RV.
SV and VW are drawn.
TW intersects SV at K
$\hat{S}_2 = x$



11.3.1 Write down, without reasons, 3 other angles that are equal to x. (3)

11.3.2 Prove, with reasons, that WSTV is a cyclic quadrilateral. (2)

11.3.3 Show that ΔRVW is an isosceles triangle. (4)

11.3.4 Prove that $\Delta RVW \,///\, \Delta SVT$. (3)

11.3.5 Hence, show that $\frac{RV}{\cancel{ST}\ SV} = \frac{WR}{TS}$ (2)

[31]

TOTAL: 150

INFORMATION SHEET

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

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

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

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

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

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

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

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

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

In ΔABC: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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

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

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

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

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

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

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