Downloaded from SEE academy: www.seeacademy.co.za

education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT

GRADE 11

MATHEMATICS P2

NOVEMBER 2024

MARKS: 150

TIME: 3 hours

SEE ACADEMY

This question paper consists of 12 pages and 1 information sheet.

Copyright reserved

Downloaded from SEE academy: www.seeacademy.co.za

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.

SEE ACADEMY

Downloaded from SEE academy: www.seeacademy.co.za

QUESTION 1

The traffic department set up a roadblock on the N12 between Potchefstroom and Klerksdorp. During the first hour, they stopped 11 minibus taxis.
The following dataset is a summary of the number of passengers per minibus taxi.

18, 26, 25, 18, 16, 12 ,10, 8, 18, 17, 8

1.1 Calculate the mean number of passengers per taxi. (2)

1.2 Calculate the standard deviation for this dataset. (1)

1.3 Taxis in which the number of passengers is more than one standard deviation above the average can be considered overloaded.
How many taxis were overloaded? (2)

1.4 During the second hour of the roadblock, a further 5 minibus taxis were stopped. The number of passengers in these 5 taxis are: x, 13, 18, y, 20.

These 5 numbers are already arranged from smallest to largest.

The entire dataset for the first and second hours is collectively represented on a box-and-whisker diagram. The new average number of passengers for the 16 taxis is 16. The five-number summary can be seen on the diagram below.



1.4.1 Discuss the skewness of the data. (1)

1.4.2 What percentage of the minibus taxis had more than 11 passengers? (1)

1.4.3 Calculate the value of x and y. (4)
[11]

SEE ACADEMY

Downloaded from SEE academy: www.seeacademy.co.za

QUESTION 2

The traffic department has also conducted further investigation into where the best locations would be on the N12 to install speed cameras. Part of the investigation involved a survey of the different speeds of vehicles on the N12 between Potchefstroom and Klerksdorp.

The following table shows the results of the investigation:

SPEED (d) (in km/h)	**FREQUENCY (number of vehicles)**	**CUMULATIVE FREQUENCY**
$40 < d \leq 60$	25	
$60 < d \leq 80$	46	
$80 < d \leq 100$	67	
$100 < d \leq 120$	79	
$120 < d \leq 140$	24	
$140 < d \leq 160$	8	
$160 < d \leq 180$	1	

2.1 Use the table in the answer book and complete the cumulative frequency column. (2)

2.2 How many vehicles were observed in the survey? (1)

2.3 Illustrate the information in the table by drawing a ogive (cumulative frequency curve). (4)

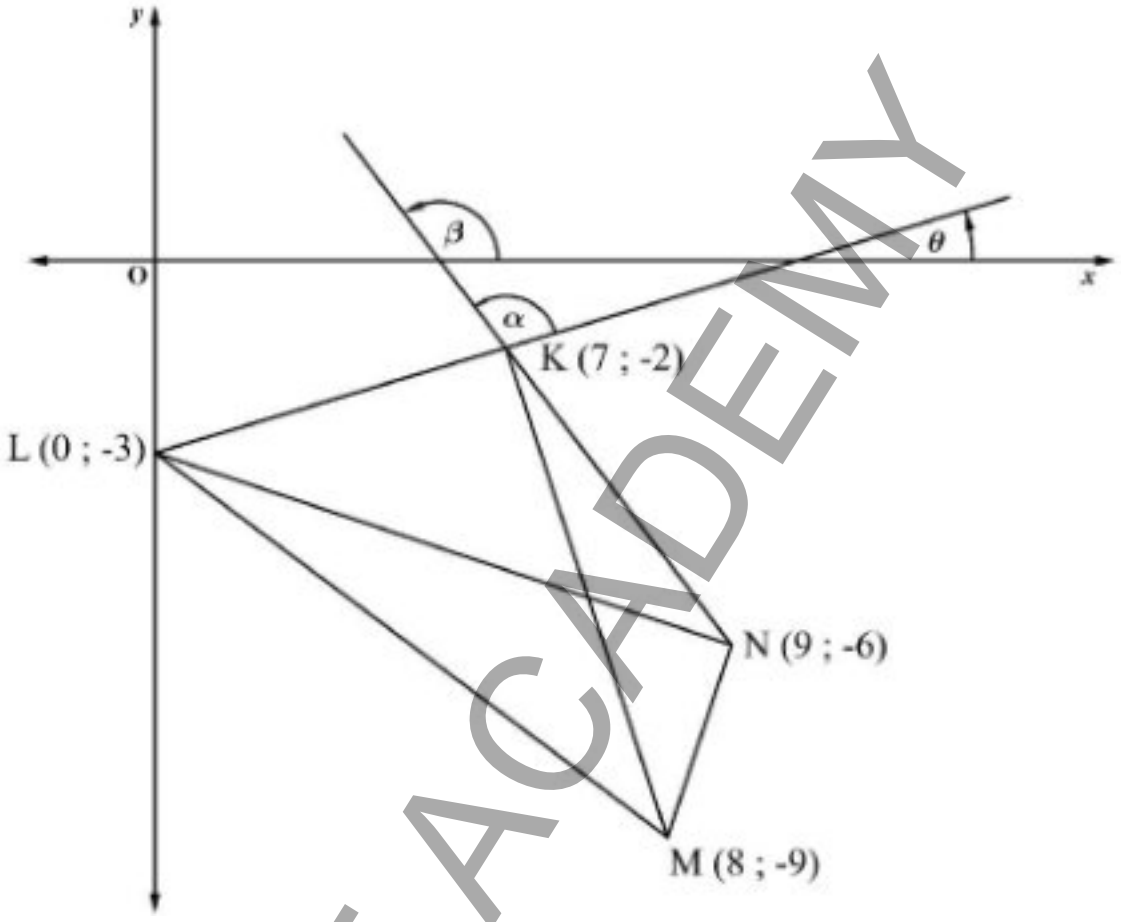
2.4 Use the ogive to determine the median of the data. Write down only the median speed. (2)
[9]

SEE ACADEMY

Downloaded from SEE academy: www.seeacademy.co.za

QUESTION 3

In the figure quadrilateral KLMN with vertices K (7 ; -2), L (0 ; -3), M (8 ; -9) and N (9 ; -6) are given. Extend NK to intersect the x-axis and form the angle β. Extend LK to intersect the x-axis and form the angle θ.



SEE ACADEMY

3.1	Calculate the gradient of KN.	(2)
3.2	Hence, determine the equation of the straight line KN.	(2)
3.3	Calculate β, the inclination angle of KN.	(3)
3.4	Calculate the size of α.	(4)
3.5	Show that KL is perpendicular to KM.	(2)
3.6	Prove that KLMN is a cyclic quadrilateral.	(5)
		[18]

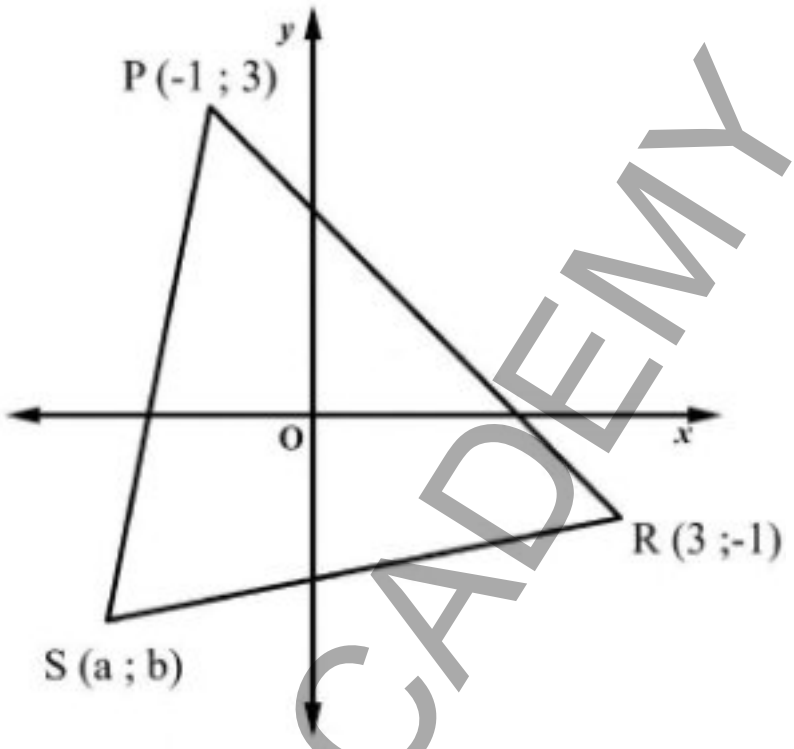
Copyright reserved

Downloaded from SEE academy: www.seeacademy.co.za

QUESTION 4

In the diagram below, P(-1 ; 3), R(3 ; -1) and S(a ; b) are the vertices of ΔPRS.

Point T lies on the perpendicular bisector of PR.



SEE ACADEMY

4.1	Calculate the coordinates of T, the midpoint of PR.	(2)
4.2	Calculate the length of PR. (Leave the answer in simplest surd form.)	(2)
4.3	Determine the equation of ST, if ST⊥PR and $m_{PR} = -1$.	(3)
4.4	Hence prove that $a = b$.	(1)
4.5	If the area of ΔPRS = 12 square units and $a, b < 0$, determine the coordinates of S.	(5)
		[13]

Downloaded from SEE academy: www.seeacademy.co.za

QUESTION 5

Answer this question **without the use of a calculator:**

5.1 If $13cos\theta - 12 = 0$ and $tan\theta$ is positive, using a sketch, determine the value of:

$$\frac{3\cos(360° - \theta) + 2\sin(360° - \theta)}{\frac{1}{5}\tan(180° + \theta)}$$ (7)

5.2 Simplify:

$$\frac{\tan 135° . sin210°}{\cos 660° + cos180°}$$ (6)

5.3 If $cos42° = p$, determine the following in terms of p:

5.3.1 $cos138°$ (2)

5.3.2 $3sin48°$ (2)

5.3.3 $sin(-2202°)$ (3)

5.4 Prove the following identity:

$$\frac{\sin x}{1 + cosx} + \frac{1}{tanx} = \frac{1}{sinx}$$ (6)

5.5 Given: $(a^2 + b^2)tan^2\theta = 2ab$ with $a > 0,\ b > 0$ and $\theta\epsilon(0° ; 90°)$.
Calculate the value of $sin\theta$ in terms of a and b. (5)
[31]

SEE ACADEMY

Downloaded from SEE academy: www.seeacademy.co.za

QUESTION 6

6.1 Solve the following equation for $x \in [-180° ; 180°]$.

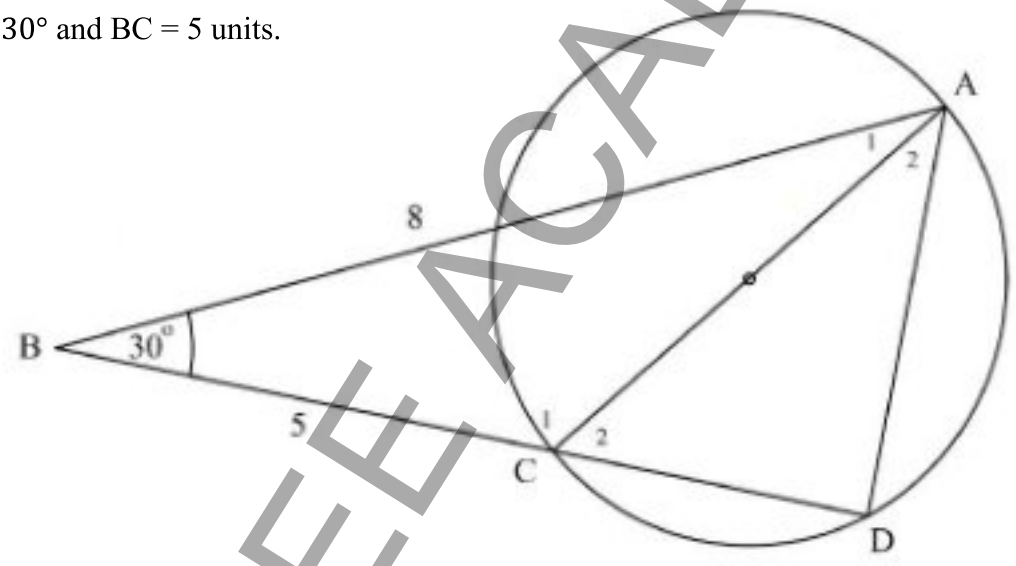
$\cos(x - 30°) = sinx$ (5)

6.2 Draw the graphs of $f(x) = \cos(x - 30°)$ and $g(x) = \sin x$ for the interval $x \in [-180° ; 180°]$ on the same set of axes.
Clearly indicate the intersections with the axes as well as the turning points on the graph. (5)

6.3 For which values of x would $f(x) - g(x) \leq 0; x \in [0° ; 180°]$? (2)
[12]

QUESTION 7

In the diagram below, circle ACD is given where AC is a diameter. DC is produced to B and AB = 8 units.
$\hat{B} = 30°$ and BC = 5 units.



7.1 Prove that AC = 4,44 units (rounded off to TWO decimal places.) (2)

7.2 Calculate the following:

7.2.1 $\hat{A}_1$ (2)

7.2.2 $\hat{C}_2$ (1)

7.2.3 AD (3)
[8]

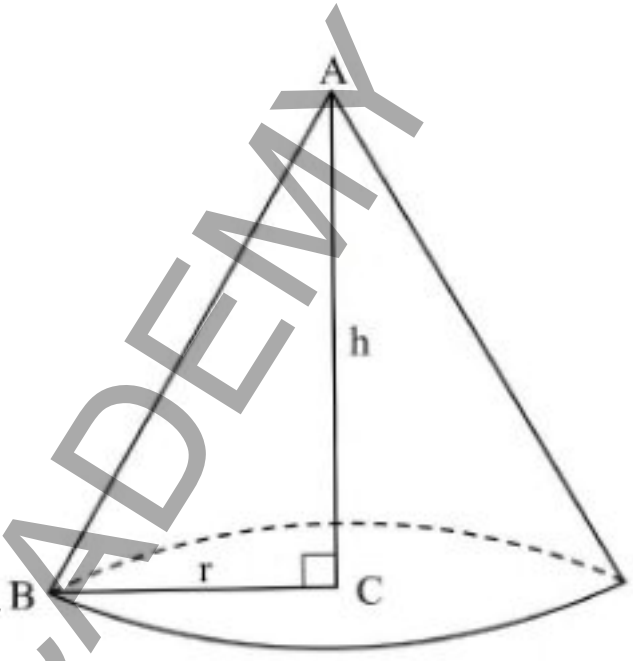
SEE ACADEMY

Downloaded from SEE academy: www.seeacademy.co.za

QUESTION 8

A mine dumps its waste at a landfill site where it takes the shape of a cone shown in the diagram below. The radius of the circular base is *r* meters, the height is *h* meters and the angle between the slant height and the base of the cone is 50°.
The circumference of the landfill site is 245 meters.

Volume of cone = $\frac{1}{3}\pi r^2 h$
Total surface area of cone = $\pi r^2 + \pi rs$



8.1 Determine the height of the mine waste, correct to ONE decimal place. (3)

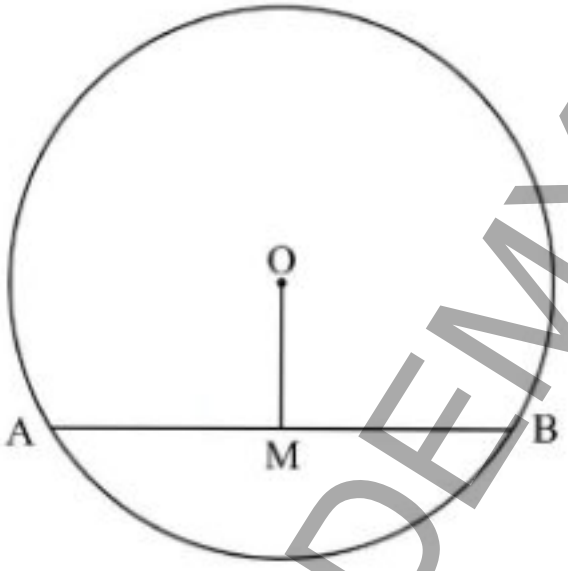
8.2 Determine the volume of the mine waste, rounded to the nearest cubic meter. (3)
[6]

SEE ACADEMY

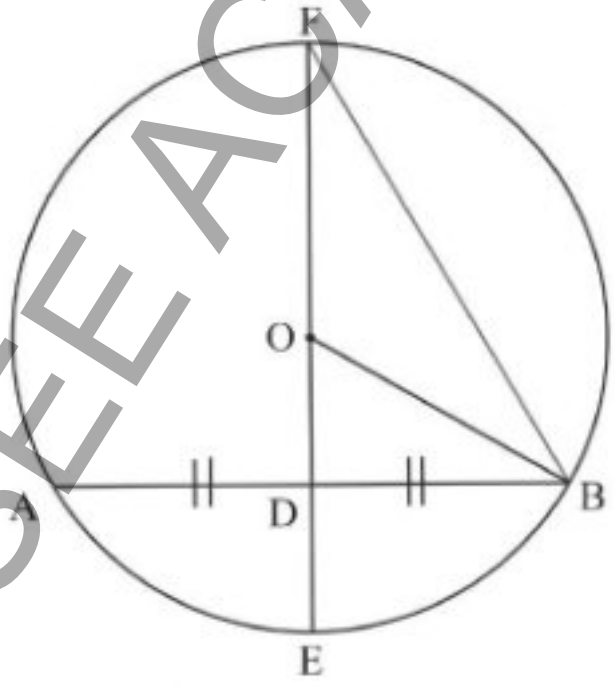
Downloaded from SEE academy: www.seeacademy.co.za

QUESTION 9

9.1 In the diagram, AB is a chord of a circle with center O. Prove the theorem that states: If M is the midpoint of AB, then OM⊥AB. (5)



9.2 In the diagram below O is the center of the circle with AD = BD.
OB = 20 mm and AB = 24 mm.



Calculate the length of:

9.2.1 DE (4)

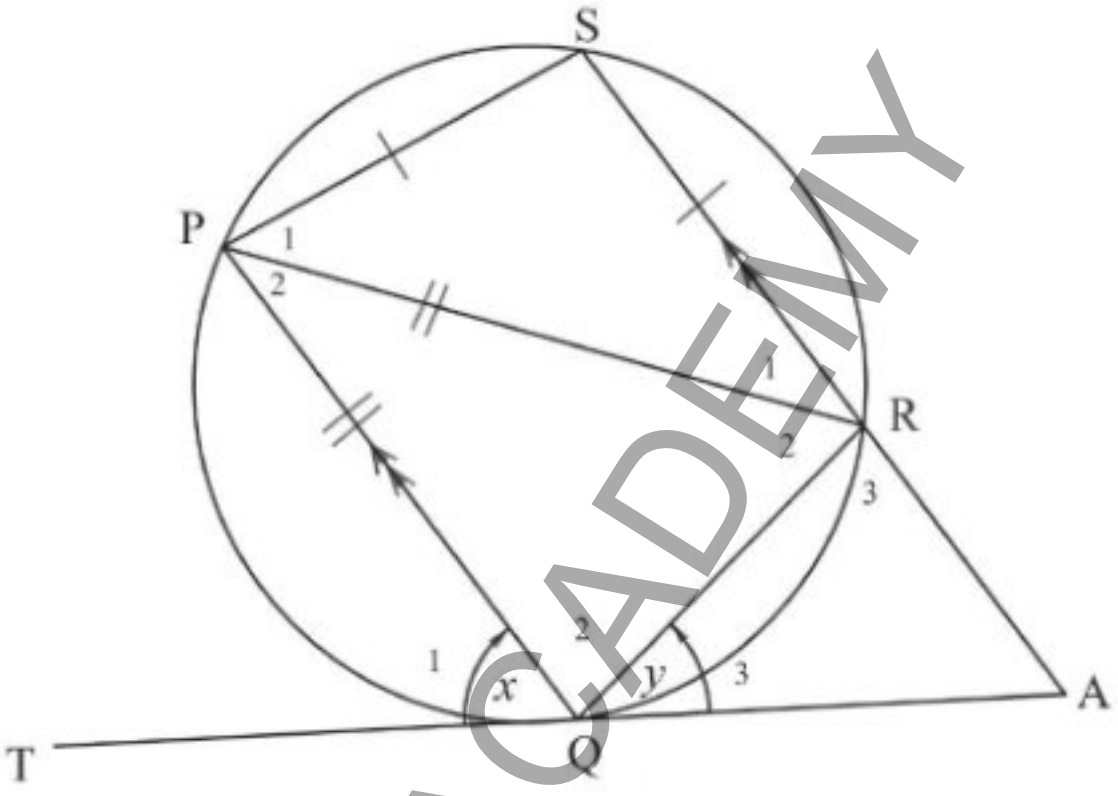
9.2.2 FB (3)
[12]

SEE ACADEMY

Downloaded from SEE academy: www.seeacademy.co.za

QUESTION 10

The circle is given below with TQA as a tangent. PS = SR and PQ = PR. $PQ \| SR$.
SR is extended to A. $\hat{Q}_1 = x$ and $\hat{Q}_3 = y$.



10.1 Give, with reasons, THREE angles equal to y. (6)

10.2 Prove that $\hat{R}_3 = x$ (4)

10.3 Prove that $\hat{S} = 180° - x$. (1)

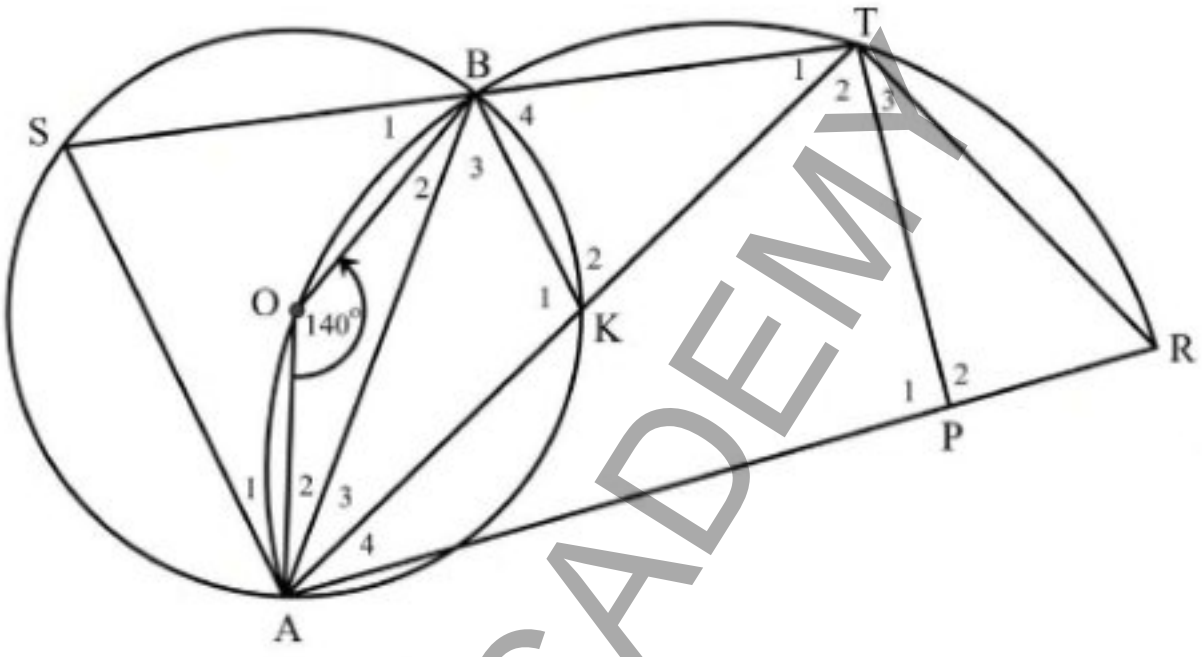
10.4 Calculate the value of x and y. (6)
[17]

SEE ACADEMY

Downloaded from SEE academy: www.seeacademy.co.za

QUESTION 11

The circle ASBK with center O is given below. Furthermore, a semicircle is drawn through points A, O, B, T and R. P lies on AR. $A\hat{O}B = 140°$.



11.1 Calculate the size of $\hat{S}$. (2)

11.2 Prove that $AS \| KB$. (5)

11.3 Calculate the size of $A\hat{T}R$. (2)

11.4 Prove that TP will be a tangent to a circle passing through points B, K, and T if $\hat{R} = 80°$ and TR = TP. (4)
[13]

TOTAL: 150

SEE ACADEMY

Copyright reserved

Downloaded from SEE academy: www.seeacademy.co.za

INFORMATION SHEET: MATHEMATICS GR11

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

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

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

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

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

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

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

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

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

SEE ACADEMY

Copyright reserved