



GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

JUNE 2022

GRADE 11

MATHEMATICS
PAPER 2

TIME: 2 hours

MARKS: 100

7 pages and 2 diagram sheets

INSTRUCTIONS AND INFORMATION

1. This question paper consists of 3 questions.
2. Answer ALL the questions.
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. Use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round off the answers to TWO decimal places, unless stated otherwise.
7. Write your name and class grade on the diagram sheet, detach and hand them in with your ANSWER BOOK.
8. Diagrams are NOT necessarily drawn to scale.
9. Number the answers correctly according to the numbering system used in the question paper.
10. Write neatly and legibly.

QUESTION 1

1.1 The points $D(-1 ; 2)$, $E(4 ; -2)$, $F(-5 ; -3)$ are vertices of $\triangle DEF$.

Determine:

1.1.1 The gradient of DF (2)

1.1.2 If line DE is perpendicular to DF , write down the gradient of DE (1)

1.1.3 The equation of the line DE in the form $y = mx + c$ (3)

1.1.4 The equation of a line parallel to DE passing through point F in the form $y = \dots$ (3)

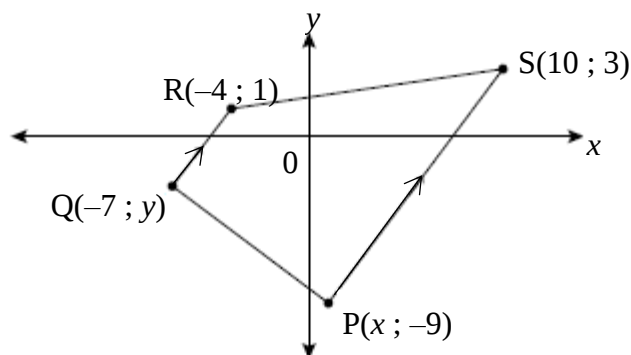
1.1.5 If $G(6 ; y)$ is a point on DE , determine the value of y (2)

1.1.6 The length of DF is equal to DE . What type of triangle is $\triangle DEF$? (5)

1.1.7 The area of triangle DEF (2)

1.2 Quadrilateral $PQRS$ is drawn below and has the following properties:

- $RQ \parallel SR$
- The coordinates of $R(-4 ; 1)$ and $S(10 ; 3)$ are given
- The coordinates of $Q(-7 ; y)$ and $P(x ; -9)$ are partially given



Determine:

1.2.1 What type of quadrilateral is $PQRS$? (1)

1.2.2 The value of x if $RS = 15$ units (5)

1.2.3 The co-ordinates of T , the midpoint of RS (2)

1.2.4 The value of y (3)

1.2.5 The coordinates of W , a point on SP such that $PQRW$ is a rectangle (3)

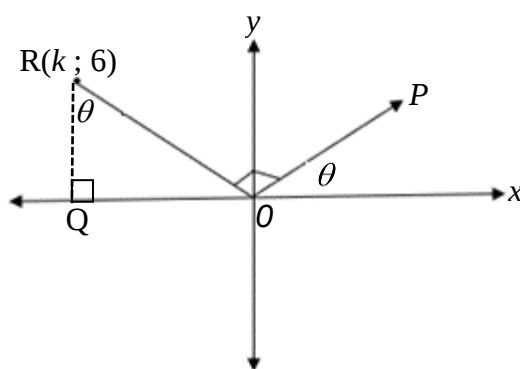
[32]

QUESTION 2

- 2.1 In the diagram, P is a point in the first quadrant such that $5\sin(90^\circ - \theta) - 3 = 0$.
 $R(k; 6)$ is a point in the second quadrant such that $\hat{P}OR = 90^\circ$.

In the diagram below:

- $\hat{P}QR = 90^\circ$ and $\hat{P}OR = 90^\circ$
- $R(k; 6)$ is a point in the quadrant 2
- P is a point in quadrant 1 such that $5\sin(90^\circ - \theta) - 3 = 0$

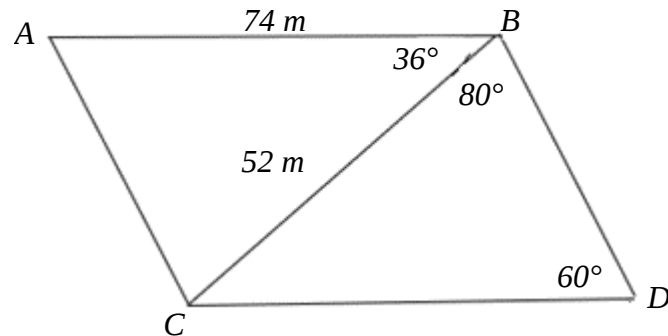


Determine:

- 2.1.1 $\sin \theta$ (3)
- 2.1.2 The value of k (3)
- 2.2 Simplify fully:
- 2.2.1 $\frac{\tan 315^\circ + \cos 300^\circ}{\sin 150^\circ + \tan 135^\circ}$ (6)
- 2.2.2 $\frac{\sin(180^\circ + x) \cos(180^\circ - x) \cdot \sin 50^\circ}{\tan(315^\circ) \cdot \cos^2(360^\circ - x) \cdot \cos 140^\circ}$ (6)
- 2.3 If $x \in [-180^\circ; 180^\circ]$, determine $\sin(x + 10^\circ) - \cos(x - 30^\circ) = 0$. (7)

2.4 In the quadrilateral below:

- $\hat{A}BC = 36^\circ$, $\hat{C}BD = 80^\circ$, $\hat{B}DC = 60^\circ$
- Lines $AB = 74$ m and $BC = 52$ m

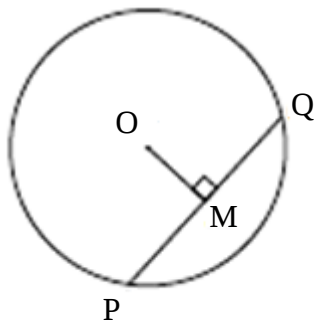


Calculate:

- 2.4.1 The value of $\hat{B}CD$ (1)
- 2.4.2 The length of line CD (2)
- 2.4.3 The length of diagonal AD (4)
- 2.4.4 The area of quadrilateral ABCD (4)
- [36]**

QUESTION 3

3.1 In the sketch below, O is the centre of the circle. Chord PQ is perpendicular to OM at M.

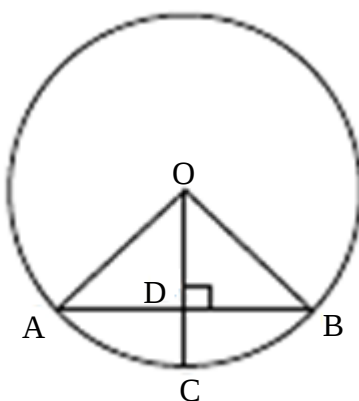


Prove the theorem that states that the line drawn from the centre of the circle perpendicular to a chord will bisect the chord.

(5)

3.2 In the sketch below:

- O is the centre of the circle
- $AB = 10$ cm and is perpendicular to OC at point D
- C is a point on the circumference of the circle
- The radius of the circle = 13 cm



Calculate the length of line DC.

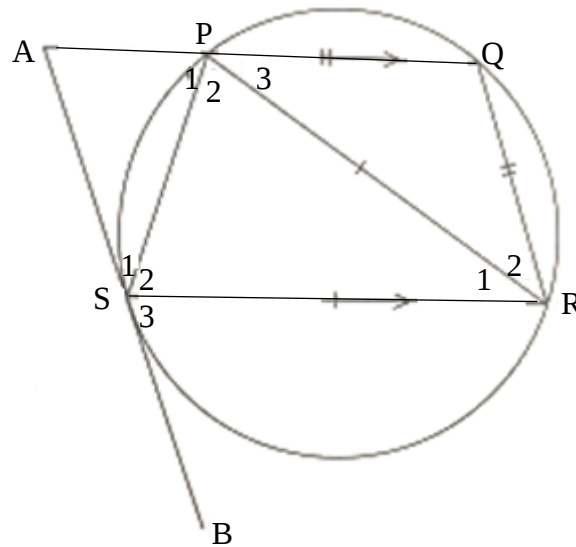
(5)

3.3 Calculate the remaining area in the circle if the area of $\triangle OAB$ is excluded.

(3)

3.4 In the sketch below:

- PQRS is a cyclic quadrilateral
- Line AB is a tangent to the circle at point S
- $PQ = QR$
- $PR = SR$
- $PQ \parallel SR$
- $\hat{BSR} = x$



3.4.1 Determine, giving reasons, FIVE angles that are equal to $\hat{BSR}$. (10)

3.4.2 Calculate the value of $\hat{S}_1$ in terms of x as well as the value of TWO other angles that are equal to $\hat{S}_1$. (6)

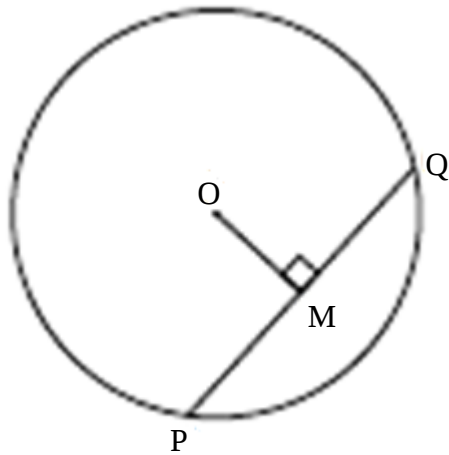
3.4.3 Prove that $PS = QR$. (3)

[32]

TOTAL: 100

DIAGRAM SHEET 1**QUESTION 3**

3.1



3.2

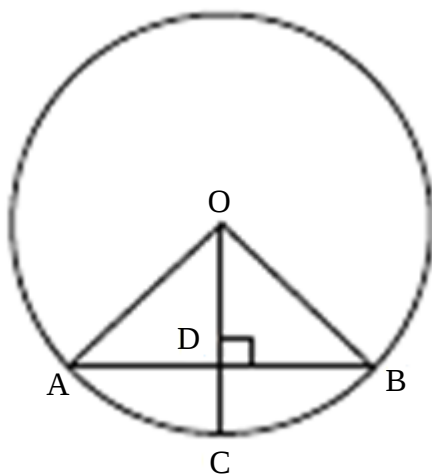


DIAGRAM SHEET 2

3.3

