education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT

GRADE 11

MATHEMATICS P2

JUNE 2024

MARKS: 100

TIME: 2 hours

This question paper consists of 8 pages and 1 diagram sheet.

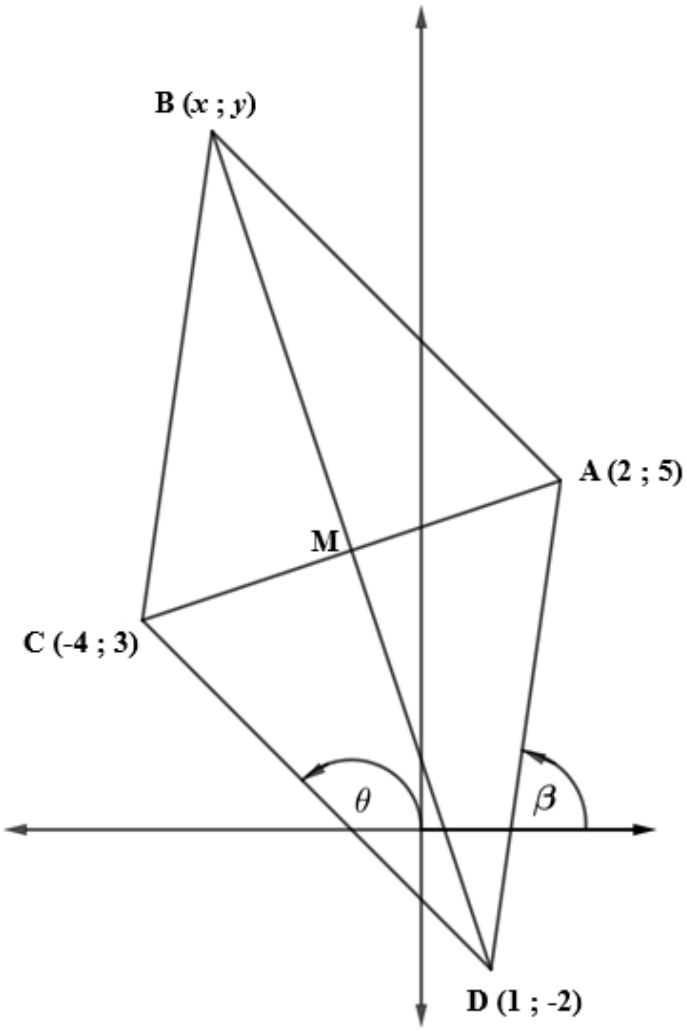
INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 5 questions.
2. Answer Question 3.2 and 4.1 on the DIAGRAMSHEET 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. Write neatly and legibly.

QUESTION 1

In the diagram below is ABCD a quadrilateral with vertices A(2 ; 5), B(x ; y); C(-4 ; 3) and D(1 ; -2).



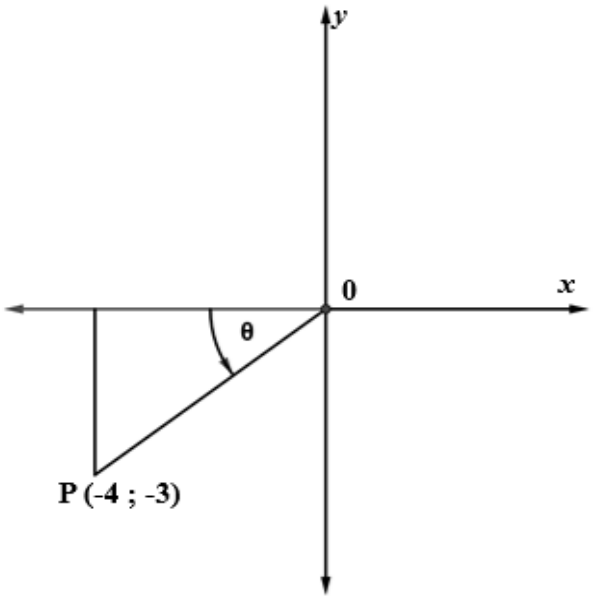
1.1	Calculate the length of AC. (Leave the answer in simplest surd form.)	(2)
1.2	Determine the coordinates of M, the midpoint of AC.	(2)
1.3	Show that BD is perpendicular to AC.	(3)
1.4	Determine the equation of DC.	(3)
1.5	Determine θ, the angle of inclination of DC.	(3)
1.6	Calculate the size of $A\widehat{D}C$.	(4)
1.7	Calculate the area of ΔADC.	(4)
1.8	Calculate the coordinates of B, so that ABCD is a parallelogram.	(3)
1.9	Determine the value of k if D, A and E (4 ; k) are collinear.	(3)

[27]

QUESTION 2

Answer this question **without using a calculator**.

2.1 In the figure below, OP is a radius with $P\ (-4\ ;\ -3)$ a point in the Cartesian plane.
$X\hat{O}P = \theta$.



2.1.1 Calculate $sin\theta$ (3)

2.1.2 If OP is produced to point $Q\ (k\ ;\ -5)$, calculate the value of *k*. (2)

2.2 Simplify:

$$\frac{\sin(180° + x).\cos(90° - x)}{\tan(180° - x).\cos(360° - x).\sin(-x)}$$ (7)

2.3 Calculate the value of θ, if $0° < \theta < 180°$, **without using a calculator**:

$$sin\theta = \sqrt{\frac{(9)^{cos300°}}{\left(\frac{1}{4}\right)^{sin150°}.(8)^{tan225°}}}$$ (8)

2.4 If $cos20° = p$, determine the following in terms of *p*:

2.4.1 $\cos(-20°)$ (2)

2.4.2 $\tan 160°$ (3)

2.5 Prove the identity:

$$\cos(90^o + x)\left[\frac{1}{tanx} + \frac{\sin x}{\sin(90° - x)}\right] = -\frac{1}{cosx}$$

(6)
[31]

QUESTION 3

3.1 Determine the general solution of the following equation:
$3cos\theta - 2sin^2\theta = 0$ (6)

3.2 Use the given set of axes on the diagram sheet and draw the graph of $f(x) = 1 + 2\cos x$ for the interval $x \in [-180° ; 180°]$.

Clearly indicate the intercepts with the axes as well as the coordinates of the turning points on the graph. (3)

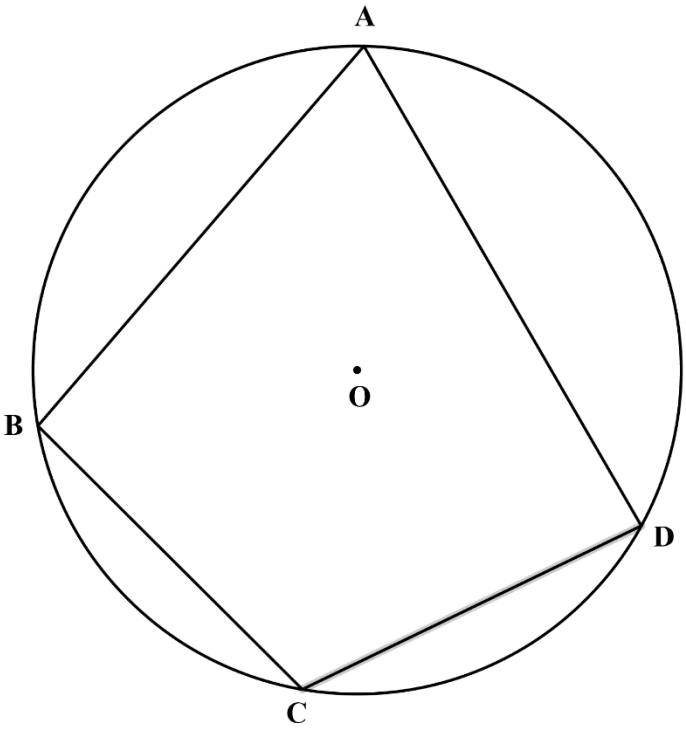
3.3 Hence, use your graph in question 3.2 and answer the following for $x \in [-180° ; 180°]$

3.3.1 For which value(s) of x is $f(x) > 0$? (2)

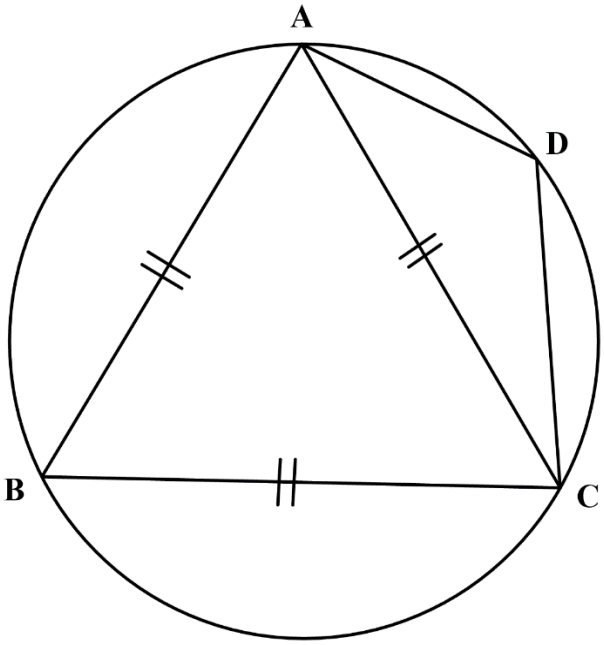
3.3.2 What is the period of $f\left(\frac{x}{2}\right) - 1$? (2)
[13]

QUESTION 4

4.1 In the diagram below, O is the centre of the circle. ABCD is a cyclic quadrilateral.
Prove the theorem that states: $B\hat{A}D + B\hat{C}D = 180°$. (5)



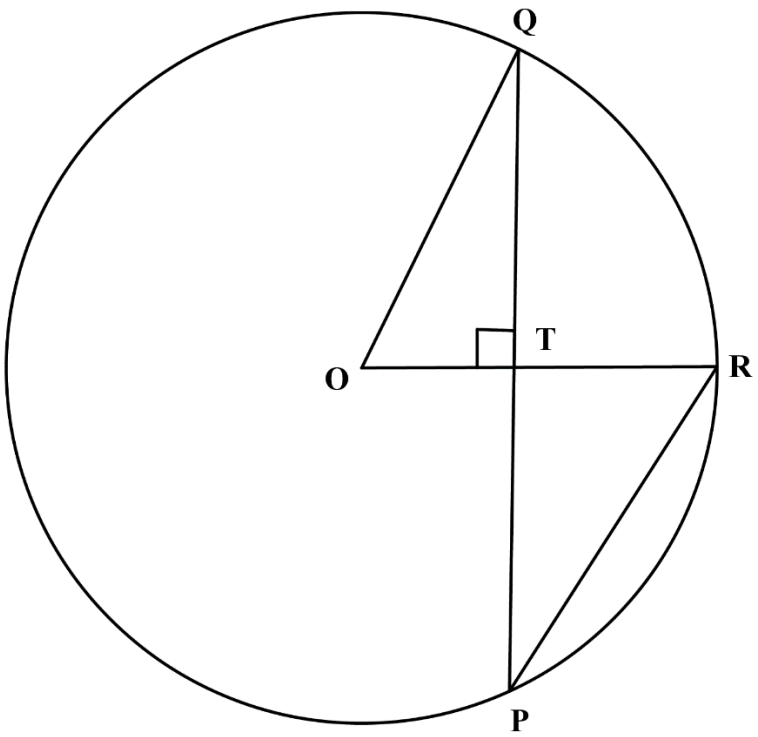
4.2 In the diagram below, ΔABC is equilateral with A, B, C and D on the circumference of the circle.
Calculate, with reasons the size of $\hat{D}$. (3)



[8]

QUESTION 5

5.1 In the diagram below, PQ is the chord of circle O. OR is perpendicular to PQ and OR intersects PQ at T. The radius of the circle is 13 cm and PT = 12 cm.

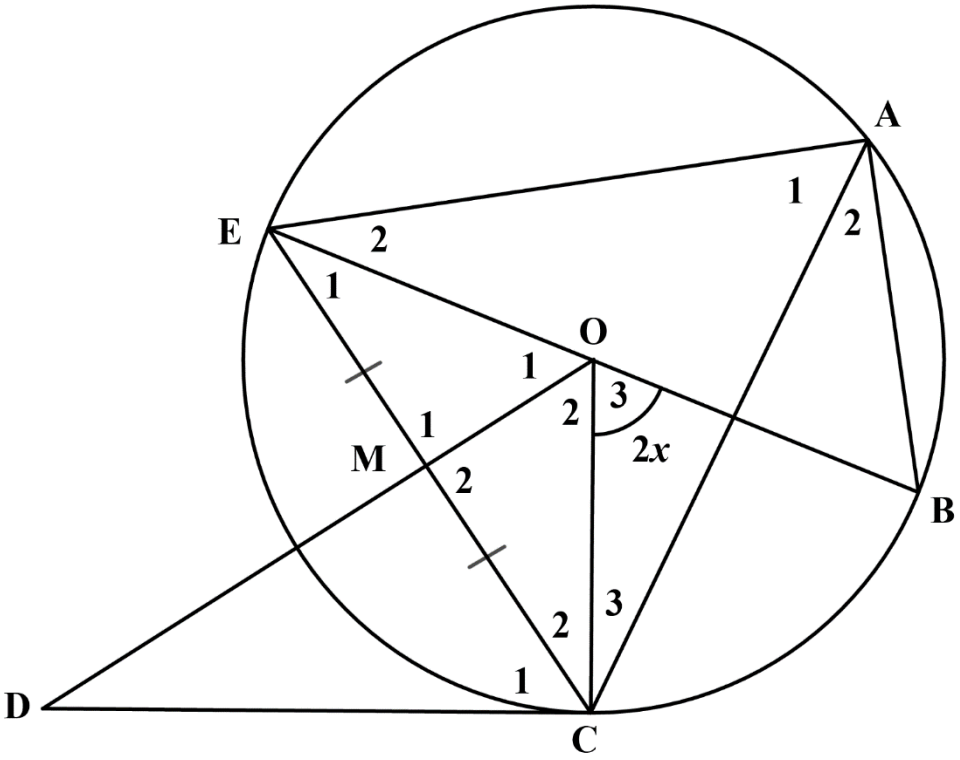


Calculate the length of:

5.1.1 PQ (2)

5.1.2 PR (4)

5.2 O is the centre of the circle in the diagram and DC is a tangent to the circle at C.
EM = MC and OMD is a straight line.
Let $\hat{O}_3 = 2x$.



5.2.1 Give, with reasons, THREE angles equal to x. (6)

5.2.2 What is the value of $E\hat{A}B$? (2)

5.2.3 Prove that $\hat{O}_2 = 90° - x$ (3)

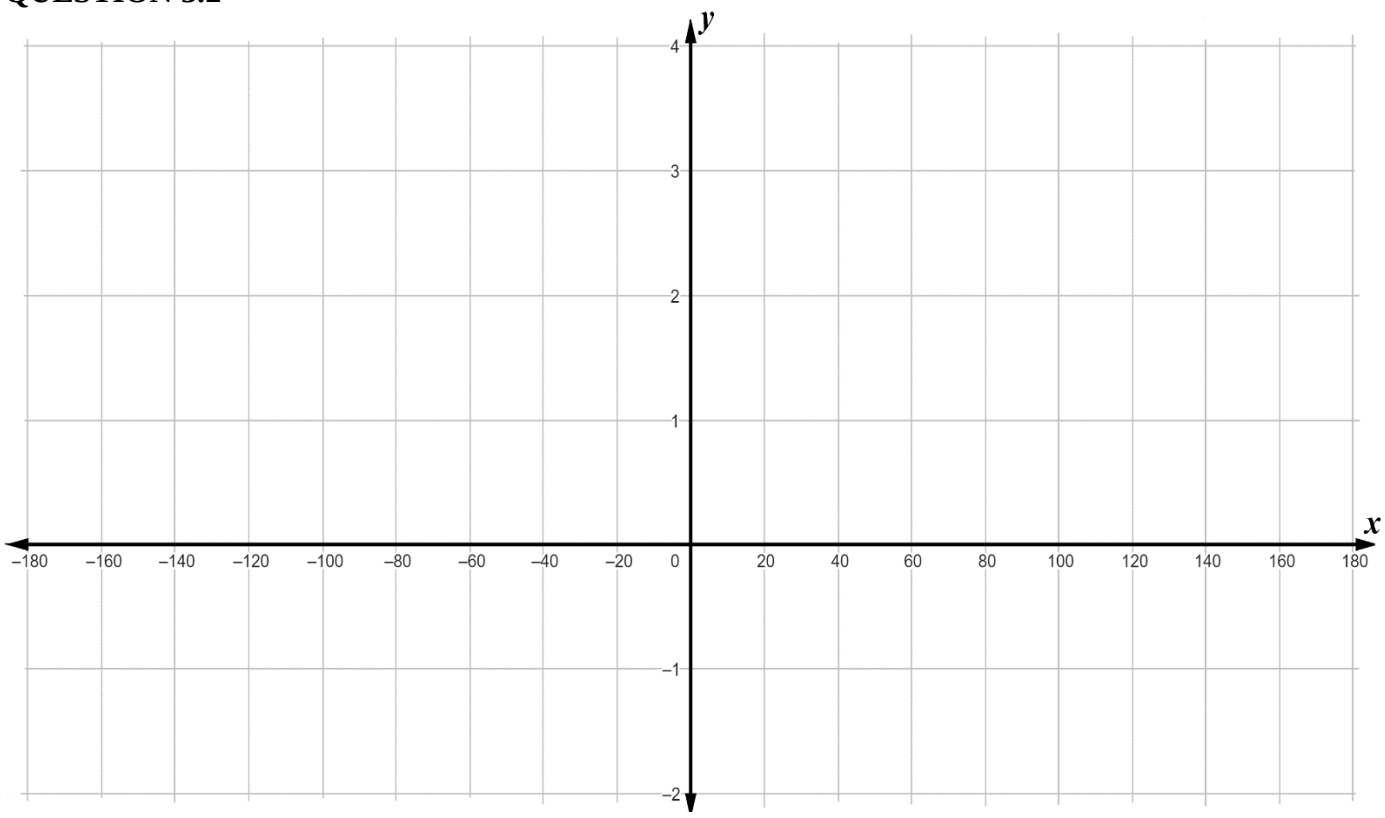
5.2.4 Prove that DEOC is a cyclic quadrilateral. (4)
[21]

TOTAL: 100

DIAGRAM SHEET

NAME: _____

QUESTION 3.2



QUESTION 4.1