



education

Department:
Education
PROVINCE OF KWAZULU-NATAL

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

MATHEMATICS P2

COMMON TEST

JUNE 2019

MARKS: 100

TIME: 2 hours

This question paper consists of 8 pages and 2 DIAGRAM SHEETS.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 6 questions.
2. Answer ALL the questions.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining your answers.
5. Answers only will NOT necessarily be awarded full marks.
6. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
7. If necessary, round off answers correct to TWO decimal places, unless stated otherwise.
8. Diagrams are NOT necessarily drawn to scale.
9. TWO DIAGRAM SHEETS for QUESTION 2.2, QUESTION 5.1, QUESTION 5.2, QUESTION 6.1 AND QUESTION 6.2 are attached at the end of this question paper. Detach the DIAGRAM SHEETS and hand in together with your ANSWER BOOK.
10. Write neatly and legibly.

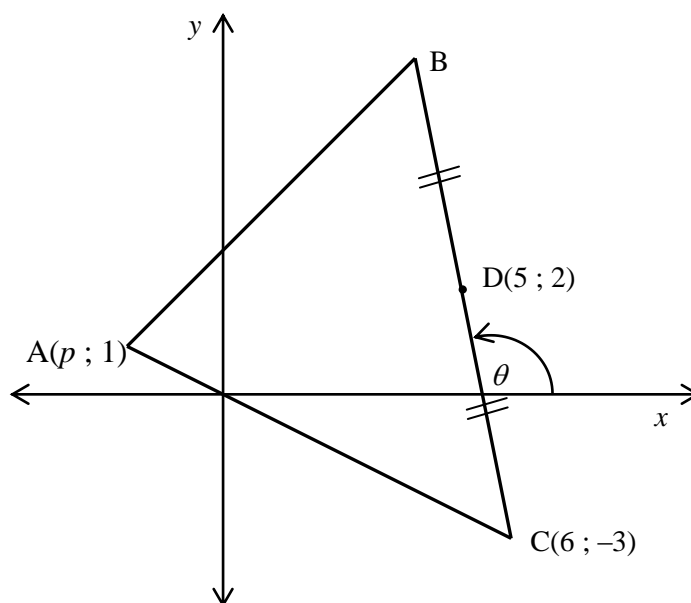
QUESTION 1

1.1 Consider the point $K(-8 ; 3)$ in the Cartesian plane.

1.1.1 Write down the equation of the horizontal line passing through K. (1)

1.1.2 Write down the equation of the vertical line passing through K. (1)

1.2 In the diagram, $A(p ; 1)$, B and $C(6 ; -3)$ are the vertices of $\triangle ABC$.
 $D(5 ; 2)$ is the midpoint of BC. A lies in the second quadrant.
DC forms an angle θ with the x -axis.



Determine the:

1.2.1 Gradient of BC. (2)

1.2.2 Size of θ , rounded off to ONE decimal place. (3)

1.2.3 Coordinates of B. (3)

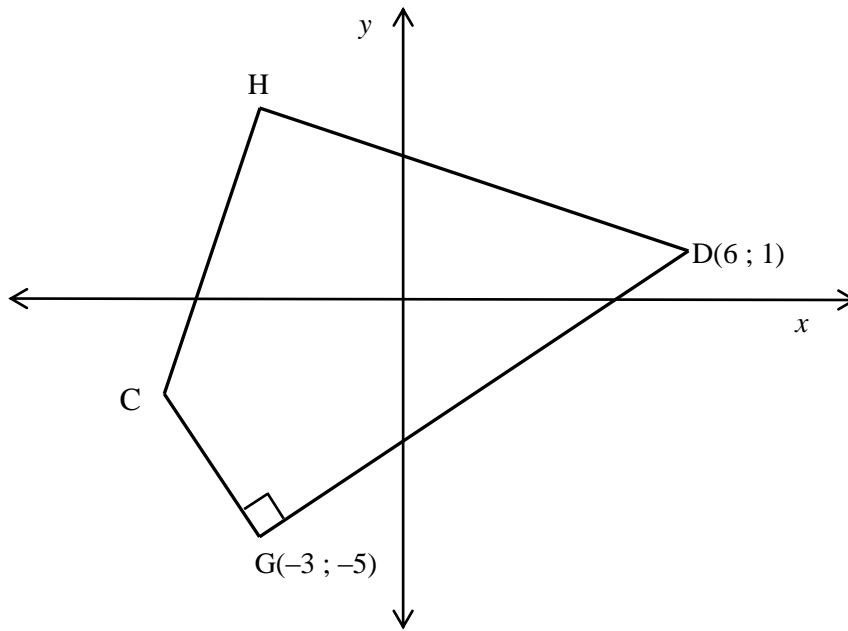
1.2.4 Value of p , if it is given that the length of $AC = 4\sqrt{5}$. (5)

[15]

QUESTION 2

2.1 Calculate the value of q if $K(-6 ; 9)$, $L(-3 ; q)$ and $M(-2 ; -1)$ are collinear. (4)

2.2 $G(-3 ; -5)$, $D(6 ; 1)$, H and C are the vertices of quadrilateral $GDHC$.
 $CG \perp GD$. The equation of CH is $y = 3x + 13$.



2.2.1 Determine the equation of CG . (4)

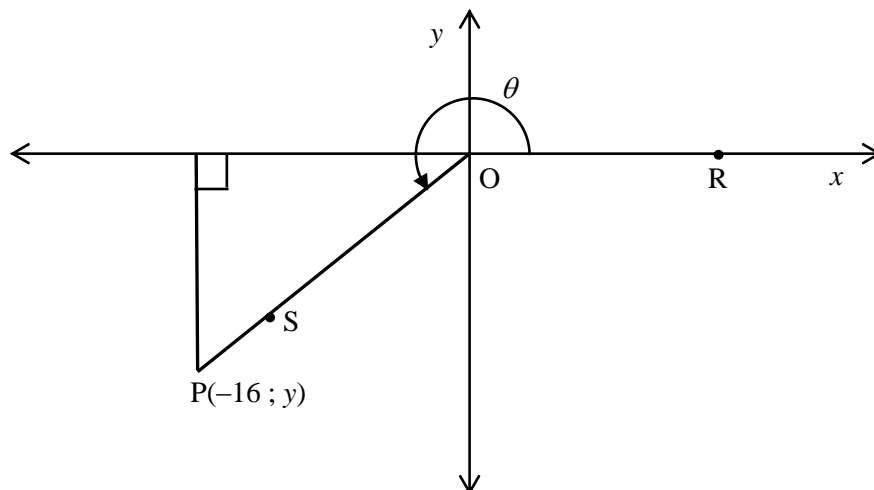
2.2.2 Calculate the coordinates of C . (3)

2.2.3 Calculate the size of \hat{GCH} . (5)

[16]

QUESTION 3

- 3.1 In the diagram below $P(-16 ; y)$ is a point such that $OP = 20$ units and reflex $\hat{R}OP = \theta$.



- 3.1.1 Calculate the value of y . (2)

- 3.1.2 Determine the value of each of the following without using a calculator:

(a) $\sin(180^\circ - \theta)$ (2)

(b) $\cos(180^\circ + \theta)$ (2)

- 3.1.3 S is a point on OP such that $OS = 15$.
Determine the coordinates of S , WITHOUT using a calculator. (4)

- 3.2 Simplify, WITHOUT the use of a calculator: $\frac{\cos(-33^\circ) \cdot \tan 147^\circ}{2 \cos 303^\circ \cdot \sin 240^\circ}$ (7)

[17]

QUESTION 4

4.1 Use trigonometric identities to prove that $\frac{\sin^3 x + \sin x \cdot \cos^2 x}{\cos x} = \tan x$ (3)

4.2 Solve for x if $\sin x = 0,412$ and $x \in [0^\circ ; 360^\circ]$. (2)

4.3 Consider the equation: $\tan 3x + 2,64 = 0$.

4.3.1 Determine the general solution of $\tan 3x + 2,64 = 0$ (4)

4.3.2 Hence, or otherwise, solve for x if $-90^\circ \leq x \leq 90^\circ$ (3)

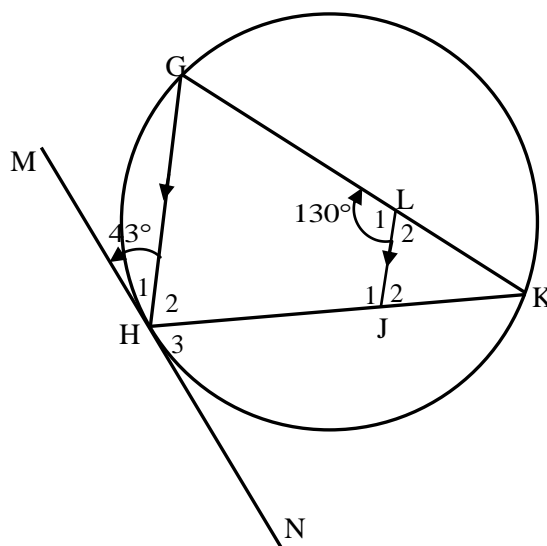
4.4 Solve for x if $4\sin^2 x + 7\cos x - 4 = 0$ and $x \in [0^\circ ; 360^\circ]$. (6)

[18]

GIVE REASONS FOR YOUR STATEMENTS AND CALCULATIONS IN QUESTIONS 5 and 6.

QUESTION 5

5.1 MHN is a tangent to circle GHK at H. L is a point on GK and J a point on HK such that LJ is parallel to GH. $\hat{H}_1 = 43^\circ$ and $\hat{L}_1 = 130^\circ$.

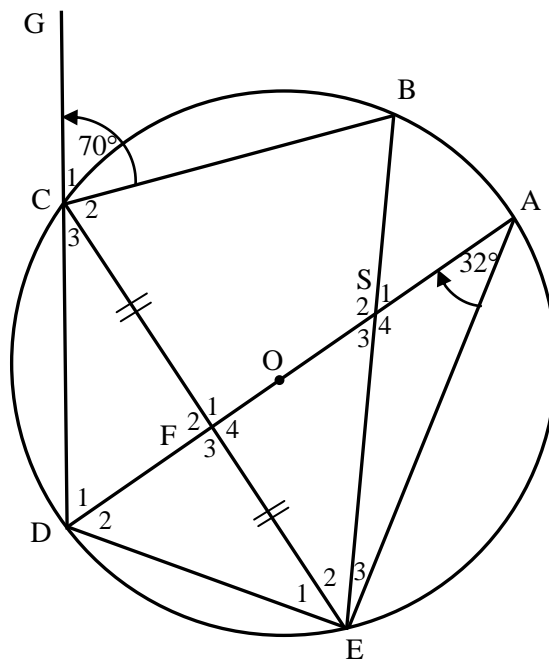


Calculate, with reasons, the size of:

5.1.1 \hat{K} (2)

5.1.2 \hat{H}_3 (4)

- 5.2 A, B, C, D and E are points on the circle having centre O. DC is produced to G. Diameter AOD bisects chord CE in F, and intersects chord BE in S. $\hat{A} = 32^\circ$ and $\hat{GCB} = 70^\circ$.



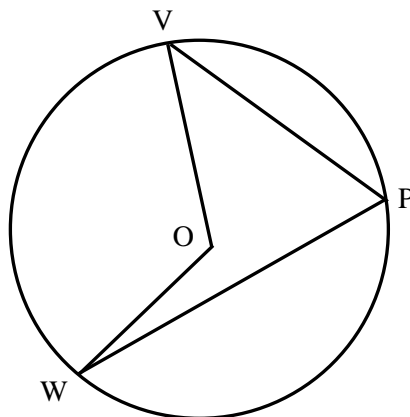
Calculate, with reasons, the sizes of the following angles:

- 5.2.1 \hat{BED} (2)
- 5.2.2 \hat{C}_2 (4)
- 5.2.3 \hat{D}_1 (3)
- 5.2.4 \hat{E}_3 (3)

[18]

QUESTION 6

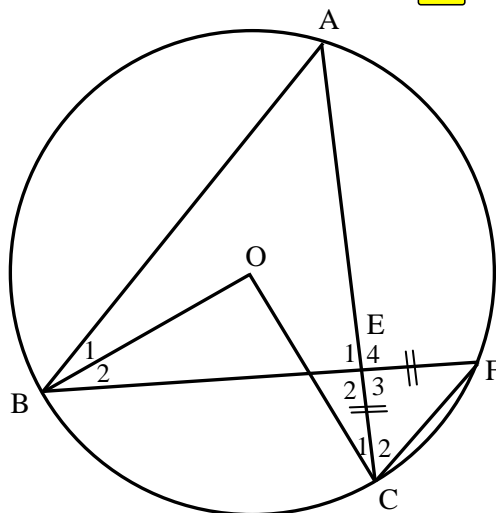
- 6.1 In the diagram, O is the centre of the circle. VP and WP are chords, and VO and WO have been drawn.



Use the diagram on the DIAGRAM SHEET to prove the theorem which states that an angle that an arc subtends at the centre of a circle is twice the size of the angle subtended by the same arc at the circle i.e. $\angle VOW = 2\angle VPW$.

(6)

- 6.2 In the diagram, O is the centre of the circle. A, B, C and F are points on the circumference. AC and BF intersect in E and $EF = FC$.



Prove that:

- 6.2.1 $AB \parallel FC$. (5)

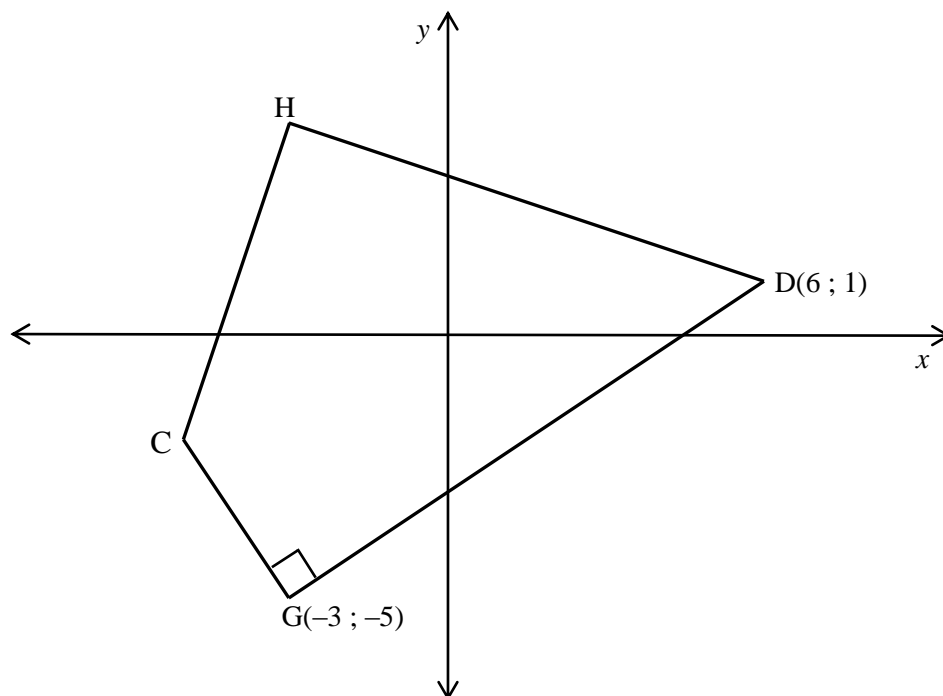
- 6.2.2 OBCE is a cyclic quadrilateral. (5)

[16]**TOTAL: 100**

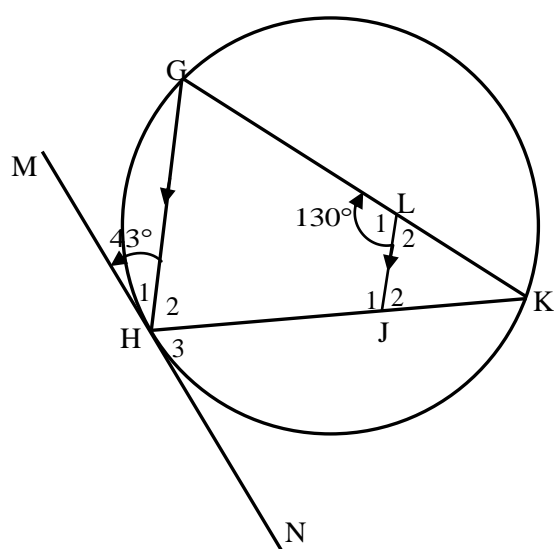
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DIAGRAM SHEET 1

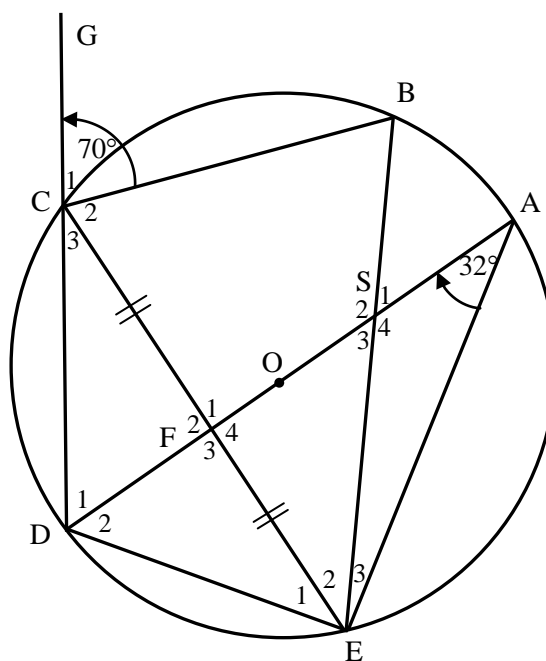
QUESTION 2.2



QUESTION 5.1



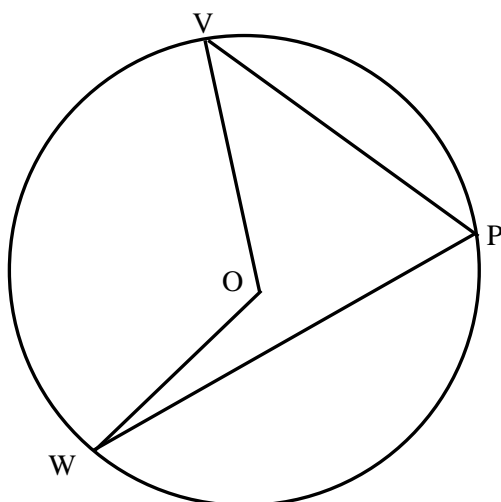
QUESTION 5.2



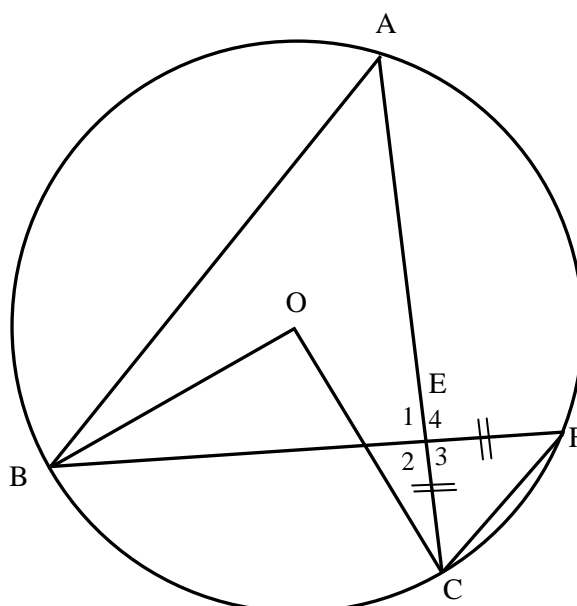
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DIAGRAM SHEET 2

QUESTION 6.1



QUESTION 6.2



TEAR OFF