



Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

MATHEMATICS P2

COMMON TEST

JUNE 2016

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

MARKS: 100

TIME: 2 hours

This question paper consists of 8 pages and 3 diagram sheets.

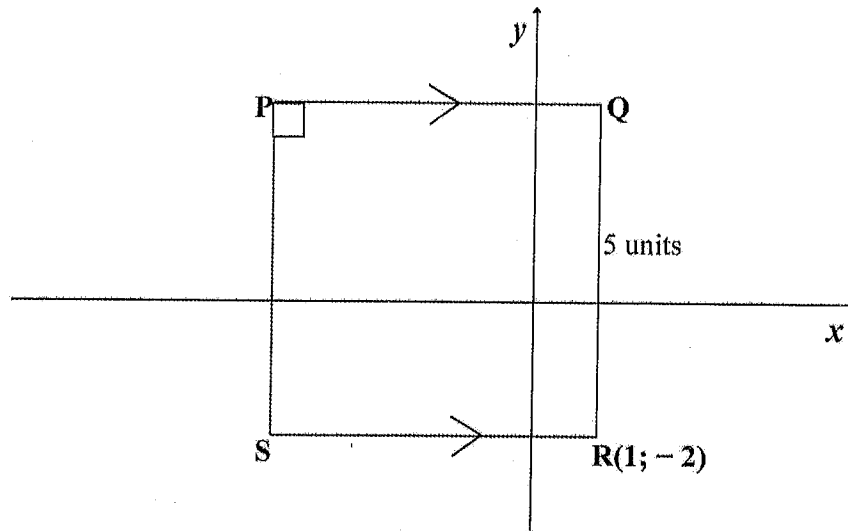
INSTRUCTIONS AND INFORMATION

Read the following instruction carefully before answering the questions.

1. The question paper consists of 6 questions.
2. Answer **ALL** the questions.
3. Clearly show all calculations and diagrams that you have used in determining your answers.
4. You may use an approved scientific calculator (non-programmable and non-graphical).
5. If necessary round off answers to **TWO** decimal places, unless otherwise stated.
6. Answers only will not be awarded full marks.
7. Diagrams not necessarily drawn to scale.
8. Number the answers correctly according to the numbering system used in this question paper.
9. Write neatly and legibly.

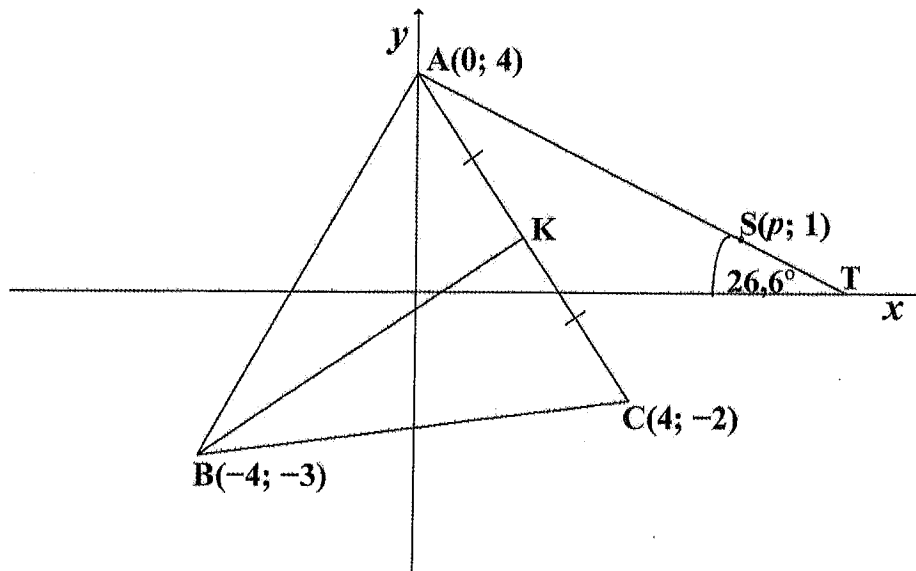
QUESTION 1

1.1 In the diagram below PQRS is a square with sides of 5 units. The coordinates of R is $(1; -2)$. PQ is parallel to the x -axis.



- 1.1.1 Write down the coordinates of Q. (1)
- 1.1.2 Write down the coordinates of S. (1)
- 1.1.3 Write down the equation of PQ. (1)
- 1.1.4 Write down the equation of QR. (1)

1.2 In the sketch below $A(0; 4)$, $B(-4; -3)$ and $C(4; -2)$ are the vertices of $\triangle ABC$. K is the midpoint of AC. AT is drawn with T a point on the x -axis, such that the acute angle between AT and the x -axis is equal to $26,6^\circ$. $S(p; 1)$ is a point on AT.

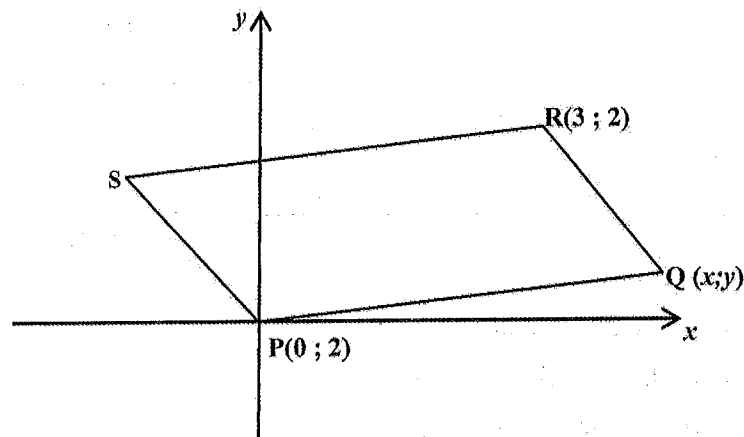


- 1.2.1 Determine the coordinates of point K. (2)
- 1.2.2 Calculate the length of AC, correct to 2 decimal places. (2)
- 1.2.3 Calculate the gradients of BK and AC and then show that $\hat{BKC} = 90^\circ$. (5)
- 1.2.4 Determine the equation of line BK. (3)
- 1.2.5 Calculate the area of $\triangle ABC$, correct to 2 decimal places. (5)
- 1.2.6 Calculate the value of p . (5)

[26]

QUESTION 2

- 2.1 PQRS is a parallelogram. The equation of PQ is $y = \frac{1}{4}x$.
The gradient of SP is equal to -1 . R is the point $(3; 2)$.



- 2.1.1 Write down the gradient of RQ. (1)
- 2.1.2 Determine the equation of RQ. (2)
- 2.1.3 Calculate the coordinates of point Q. (4)
- 2.1.4 Calculate the size of \hat{SPQ} . (5)
- 2.2 Given A $(6; 7)$, B $(0; -1)$ and C $(4; p)$.
Calculate
- 2.2.1 The length of AB. (2)
- 2.2.2 The value of p if $\mathbf{AB} = 2 \mathbf{BC}$, $p < 0$ (5)

[19]

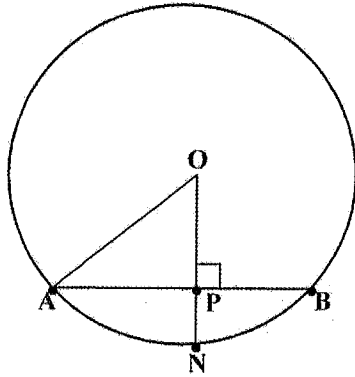
N.B: Give reasons for your statements and calculations in Questions 3 – 6.

QUESTION 3

3.1 COMPLETE: The line drawn from the centre of a circle to the midpoint of a chord

..... (1)

3.2



O is the centre of the circle. AB is a chord and $OP \perp AB$. OP is extended and intersects the circle at N.
 $AB = 16$ cm and $PN = 2$ cm.
 Let $OP = x$.

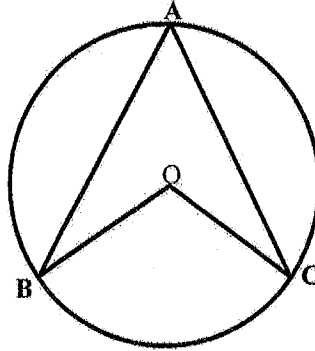
3.2.1 Calculate the length of AP. (2)

3.2.2 Calculate the length of the radius of the circle. (5)

[8]

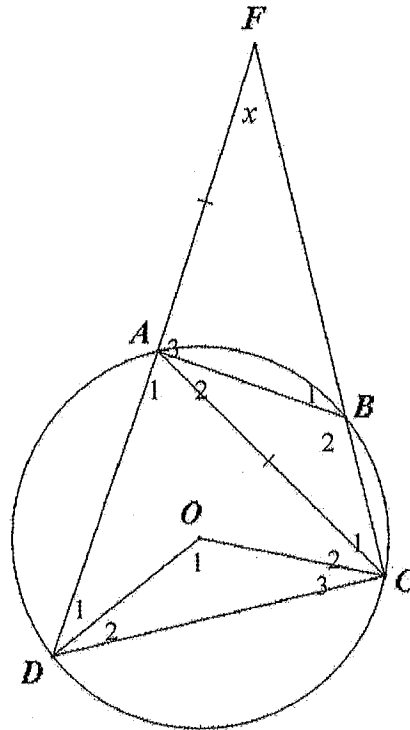
QUESTION 4

- 4.1 In the figure below O is the centre of the circle and A, B and C are three points on the circumference of the circle. Use the figure and prove the theorem that states that $\hat{BOC} = 2\hat{A}$.



(6)

- 4.2 In the figure O is the centre of the circle and ABCD is a cyclic quadrilateral. DA is produced to F such that FA = AC and CB is produced to meet DF at F.



- 4.2.1 If $\hat{F} = x$, write down, with reasons, in terms of x ,

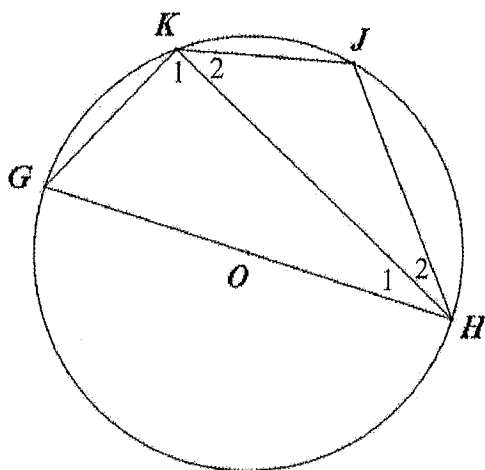
- (a) the size of \hat{A}_1 ; (4)
 (b) the size of \hat{O}_1 . (2)

- 4.2.2 If it is further given that FA = DA, find with reasons, the size of \hat{A}_3 . (6)

[18]

QUESTION 5

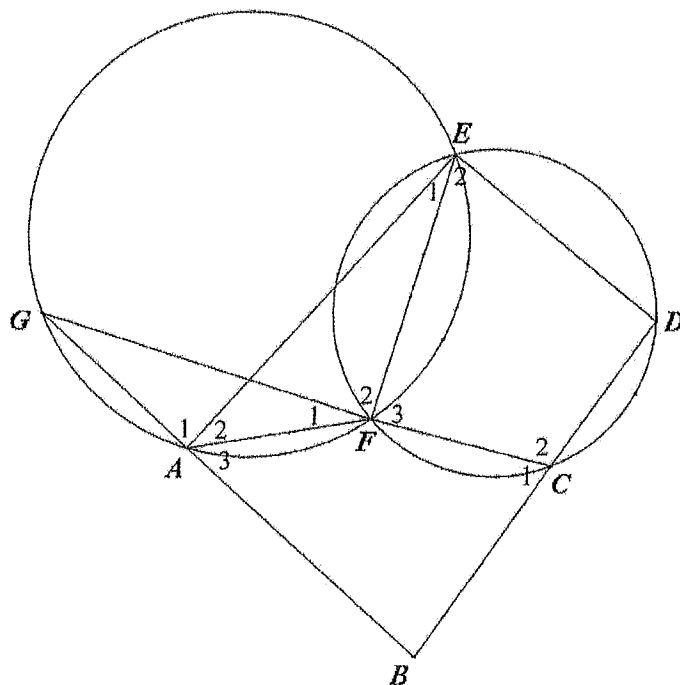
- 5.1 In the diagram below O is the centre of the circle. G, H, J and K are points on the circumference of the circle.
GOH is a diameter.
Chords GH, JH, KH, KJ and GK have also been drawn.
 $\hat{H}_1 = 26^\circ$.



Calculate, with reasons, the size of

- 5.1.1 \hat{K}_1 . (1)
5.1.2 \hat{J} . (3)

- 5.2 GAFE and FCDE are two circles. Chords GA, AF, EF, CF, CD and DE are drawn. GFC is a straight line. DC produced meets GA produced at B.
 $\hat{E}_1 = 28^\circ$ and $\hat{E}_2 = 64^\circ$.

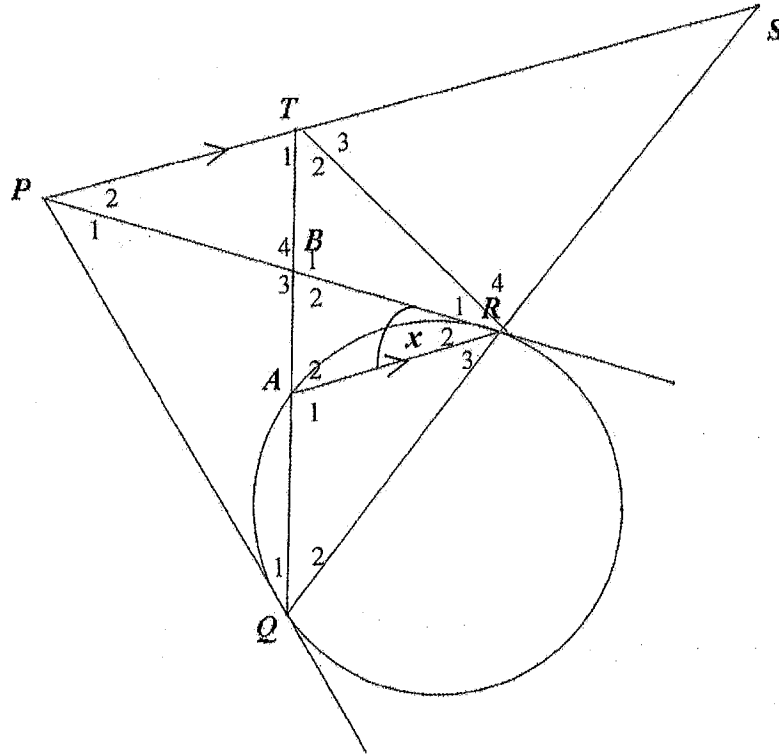


Calculate, with reasons, the size of

- 5.2.1 \hat{G} (2)
5.2.2 \hat{B} (4)

QUESTION 6

In the figure PR and PQ are two tangents drawn from point P to circle AQR. The straight line drawn through P parallel to AR meets QR produced at S, and QA produced at T. The tangent PR cuts QT at B.



Let $\hat{R}_2 = x$

- 6.1 Prove that PTRQ is a cyclic quadrilateral. (5)
- 6.2 If it is further given that QA = RA, prove that:
 - 6.2.1 $\hat{S} = x$ (3)
 - 6.2.2 PQ = RS (5)
 - 6.2.3 PTS is a tangent to circle TAR. (6)

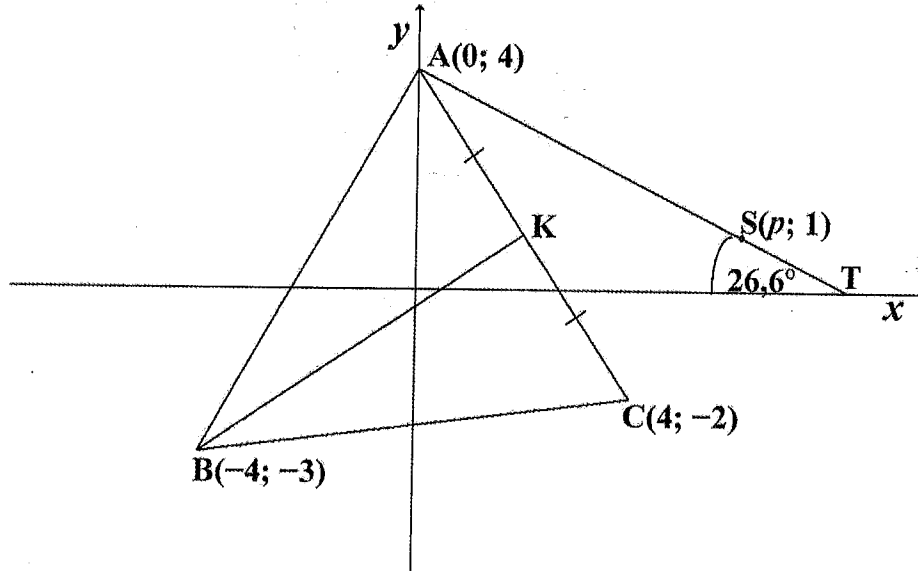
[19]

TOTAL MARKS: [100]

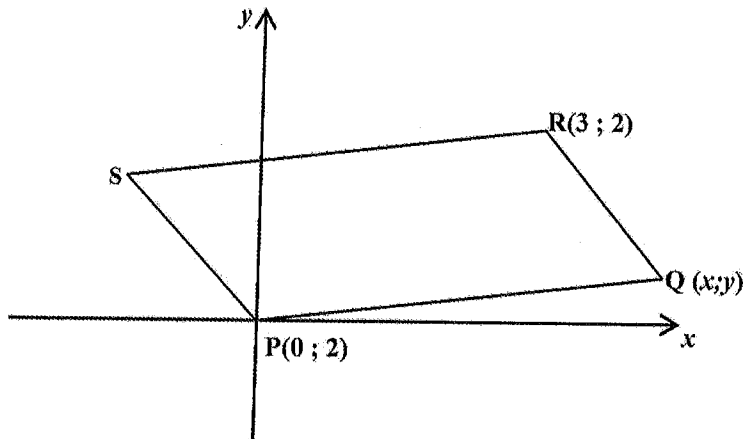
DIAGRAM SHEETS: HAND IN WITH YOUR ANSWER BOOK

NAME: _____ GRADE: _____

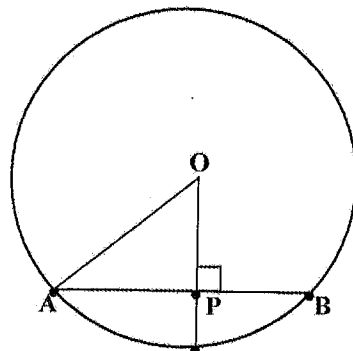
QUESTION 1.2



QUESTION 2.1

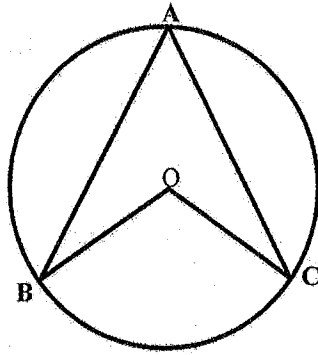


QUESTION 3.2

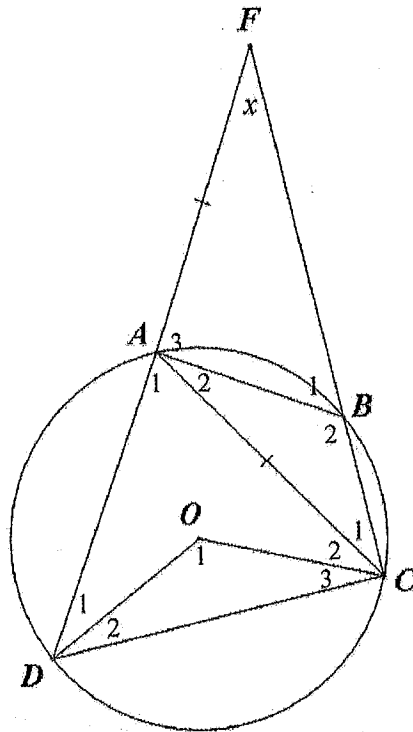


TEAR-OFF SHEET

QUESTION 4.1



QUESTION 4.2



QUESTION 5.1

