Education and Sport Development

Department of Education and Sport Development
Departement van Onderwys en Sport Ontwikkeling
Lefapha la Thuto le Tlhabololo ya Metshameko
NORTH WEST PROVINCE

GRADE 11

MATHEMATICS

MID-YEAR EXAMINATION PAPER 2

JUNE 2019

MARKS: 100

TIME: 2 hours

This question paper consists of 9 pages and 4 diagram sheets.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 7 questions.
2. AnswerALL the questions.
3. Number the answers correctly according to the numbering system used in this question paper
4. Clearly show ALL calculations, diagrams, graphs, et cetera 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, answers should be rounded off to TWO decimal places, unless stated otherwise.
8. Diagrams are NOT necessarily drawn to scale.
9. Write neatly and legibly.

QUESTION 1

$A(3;4)$, $B(-1;1)$ and $C(a;-2)$ are three points in the Cartesian plane.
Determine

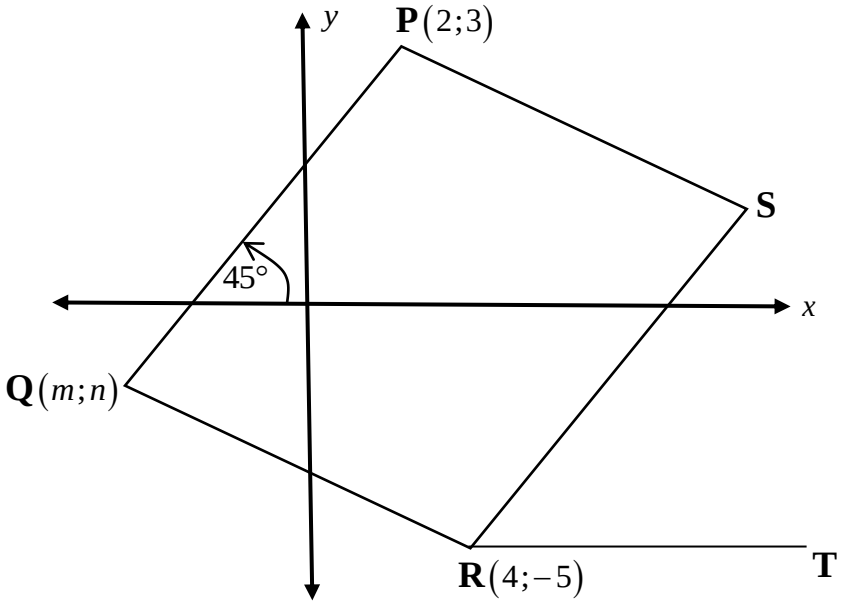
1.1 the gradient of AB (2)

1.2 the value of a if $(0;1)$ is the midpoint of AC (2)

[4]

QUESTION 2

The points $P(2;3)$, $Q(m;n)$; $R(4;-5)$ and S are the vertices of quadrilateral PQRS. The angle between PQ and the positive direction of the $x-$ axis is $45°$. RT is parallel to the $x-$ axis.



2.1 Determine the equation of the line through P and R (3)

2.2 Calculate the gradient of PQ (2)

2.3 Determine the lengths of PQ and QR in terms of m and n (3)

2.4 If PQRS is a rhombus, show that point Q is $\left(-\frac{11}{3};-\frac{8}{3}\right)$ (6)

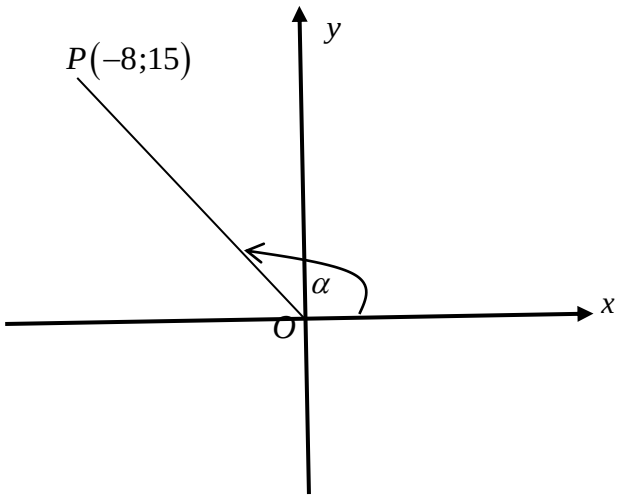
2.5 Determine the equation of QS if PQRS is a rhombus. (4)

2.6 Determine the size of $Q\hat{P}S$ (5)

[23]

QUESTION 3

3.1 Given the point $P(-8;15)$ in the Cartesian plane such that $\hat{POX} = \alpha$.



3.1.1 Calculate the length of OP (2)

3.1.2 Determine, without using a calculator, the value of

(a) $\tan\alpha$ (1)

(b) $17\sin(180° - \alpha) - \dfrac{\cos(-\alpha)}{8}$ (4)

3.1.3 Calculate the size of α, rounded off to one decimal digit. (2)

3.2 If $\sin 40° = t$, express the following in terms of t:

3.2.1 $\cos 320°$ (4)

3.2.2 $\sin 140°$ (2)

3.2.3 $\tan(-220°)$ (3)

[18]

QUESTION 4

4.1 Express as a single trigonometric ratio:

$$\frac{\sin(90°+\mathrm{A})}{\cos(540°+\mathrm{A})}+\frac{\tan(A-540°)}{\cos \mathrm{A}.\sin \mathrm{A}} \quad (6)$$

4.2 Determine the value(s) of x if

$\tan^2 x=\frac{\sin 120°.\tan 330°}{\cos 240°}$ and $x\in[-90°;90°]$, without using a calculator. (7)

4.3 Determine the general solution of:

$4\cos^2 x=3$ (4)

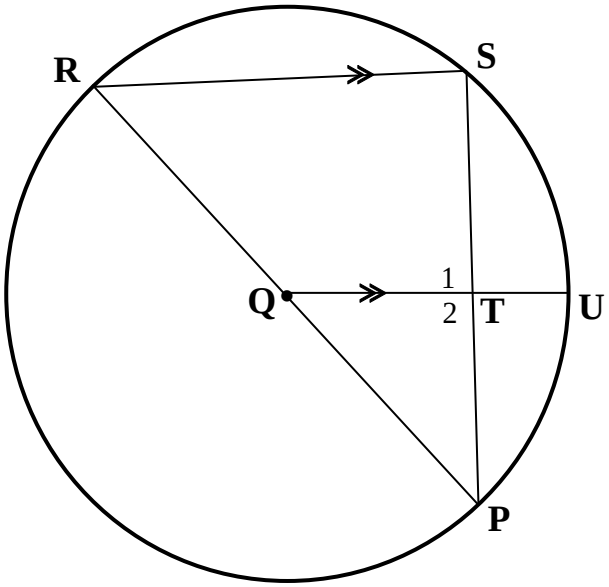
[17]

In the next four questions, ensure you give reasons for each statement you make.

QUESTION 5

5.1 The opposite anglesof a cyclicquadrilateralare … (1)

5.2 In the diagram below PR is a diameter of the circle PRSU with centre Q. QU is drawn parallel to RS and meets SP in T.



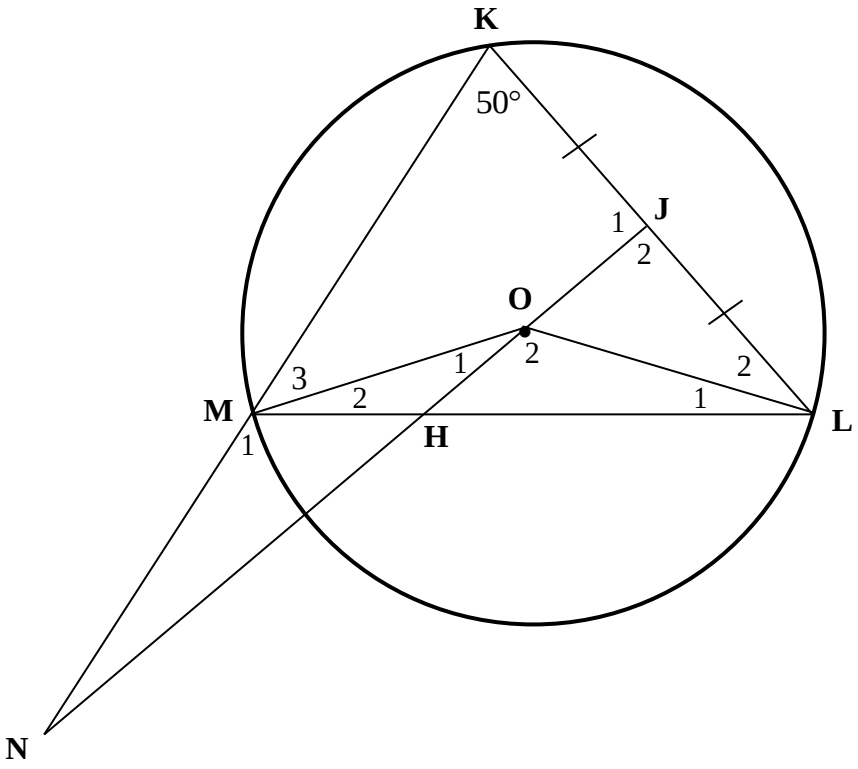
5.2.1 Write down with a reason, the size of $\hat{S}$. (2)

5.2.2 If the diameter is 20 cm and SP = 16 cm, calculate the length of TU. (6)

[9]

QUESTION 6

In the diagram below O is the centre of the circle. KJ = JL and $\hat{K} = 50°$.



6.1 Determine, giving reasons, the value of

6.1.1 $M\hat{O}L$ (2)

6.1.2 $\hat{N}$ (3)

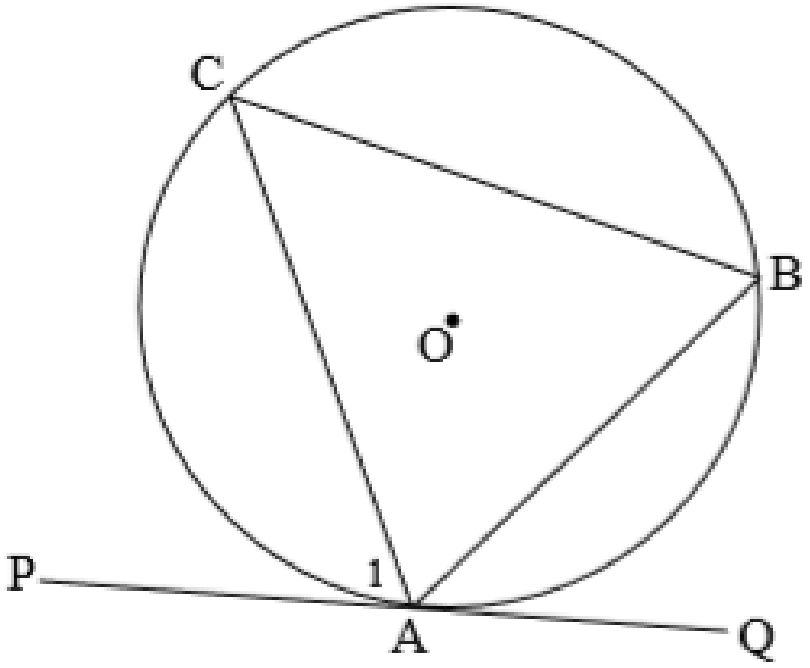
6.1.3 $\hat{L}_1$ (3)

6.2 Prove that MOLN is a cyclic quadrilateral. (2)

[10]

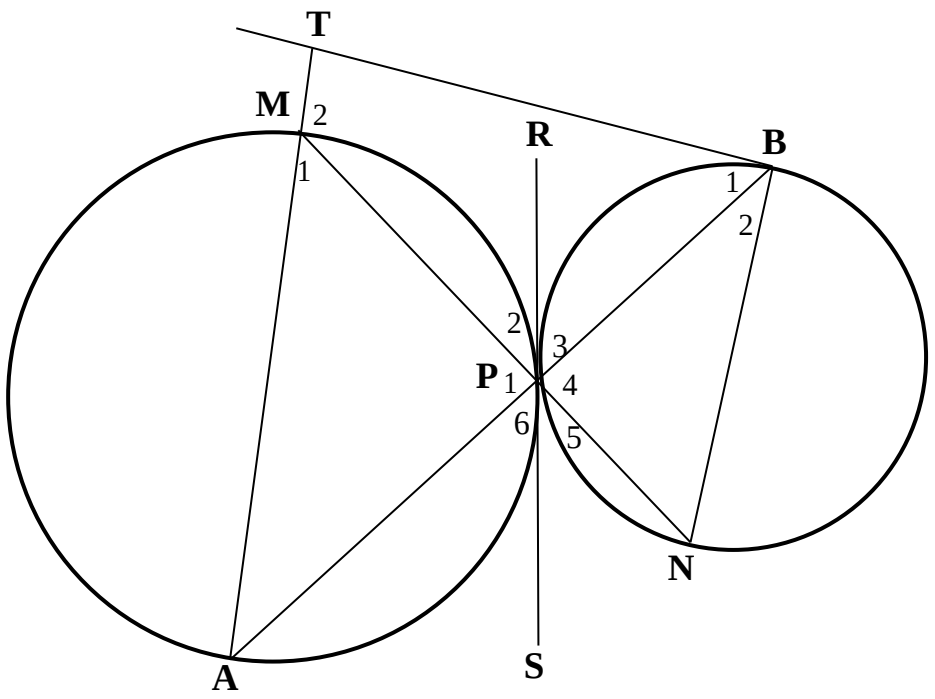
QUESTION 7

7.1 In the diagram below, O is the centre of the circle. PQ is a tangent to the circle at A. B and C are points on the circumference of the circle. AB, AC and BC are joined.



Prove the theorem that states that $\hat{A}_1 = \hat{B}$. " (5)

7.2 In the diagram, two unequal circles touch externally at P.
APB and MPN are double chords. AM isa diameter of the bigger circle.
BT is a tangent to the smaller circle at B. MP is joinedand produced to intersect the smaller circle at N. RPS is a common tangent.
AMT is a straight line.



Prove that

7.2.1 BN is a diameter of the smaller circle (3)

7.2.2 AM □ NB (5)

7.2.3 MPBT is a cyclic quadrilateral (4)

7.2.4 $\hat{T} = 90°$ (2)

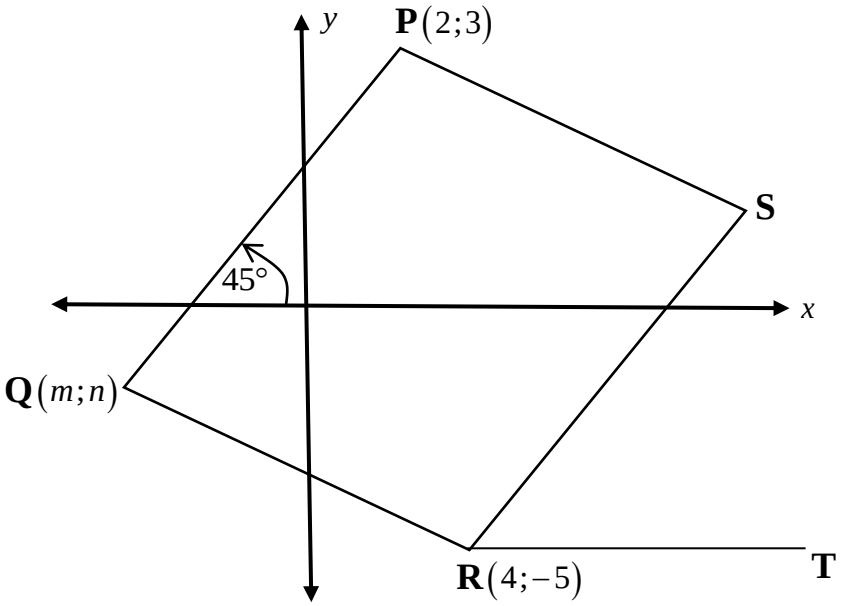
[19]

TOTAL: 100

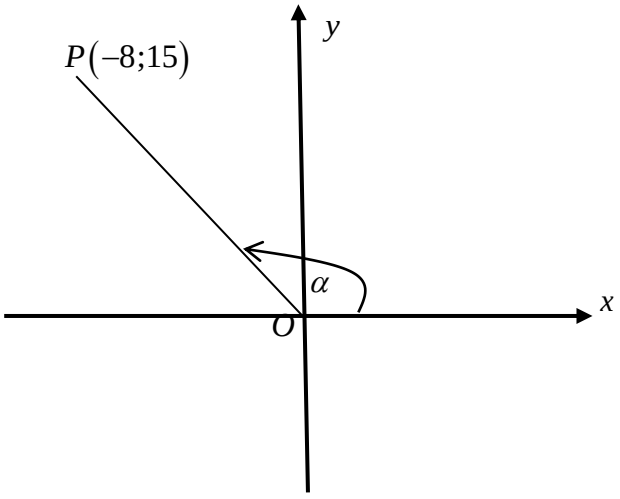
NAME OF LEARNER: ……. CLASS: ……..

DIAGRAM SHEET 1

QUESTION 2



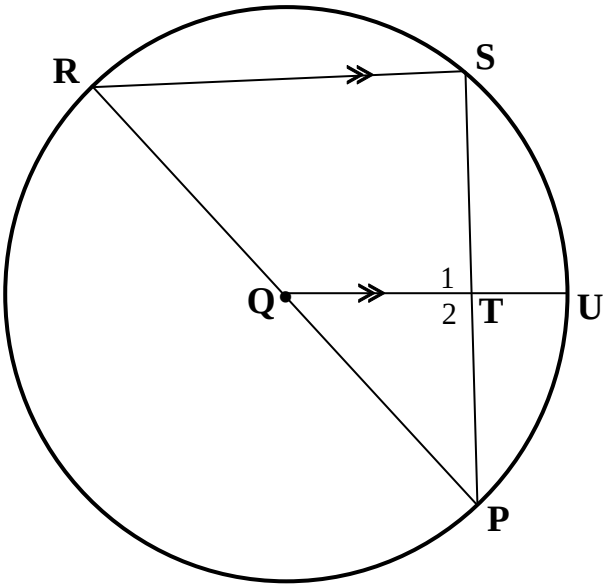
QUESTION 3.1



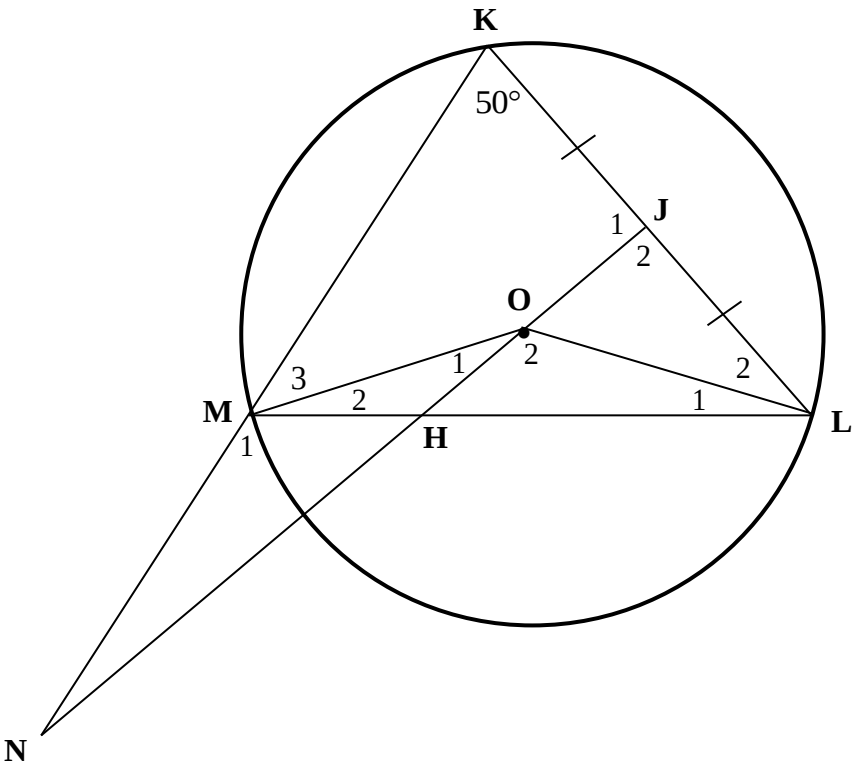
NAME OF LEARNER: ……. CLASS: ……..

DIAGRAM SHEET 2

QUESTION 5.2



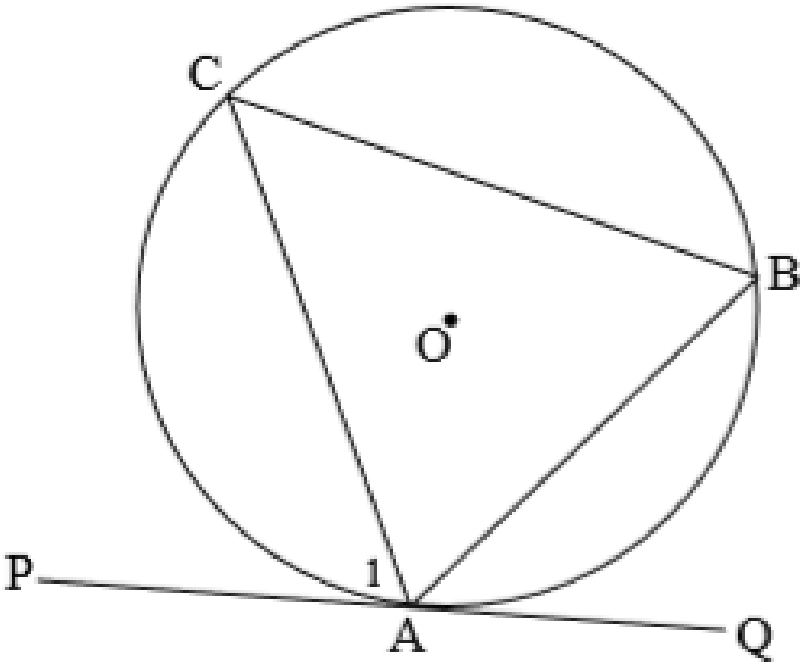
QUESTION 6



NAME OF LEARNER: ……. CLASS: ……..

DIAGRAM SHEET 3

QUESTION 7.1



NAME OF LEARNER: ……. CLASS: ……..

DIAGRAM SHEET 4

QUESTION 7.2