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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 EXAMINATION P2

JUNE 2017

MARKS: 100

TIME: 2 hours

This question paper consists of 9 printed pages and 6 diagram sheets.

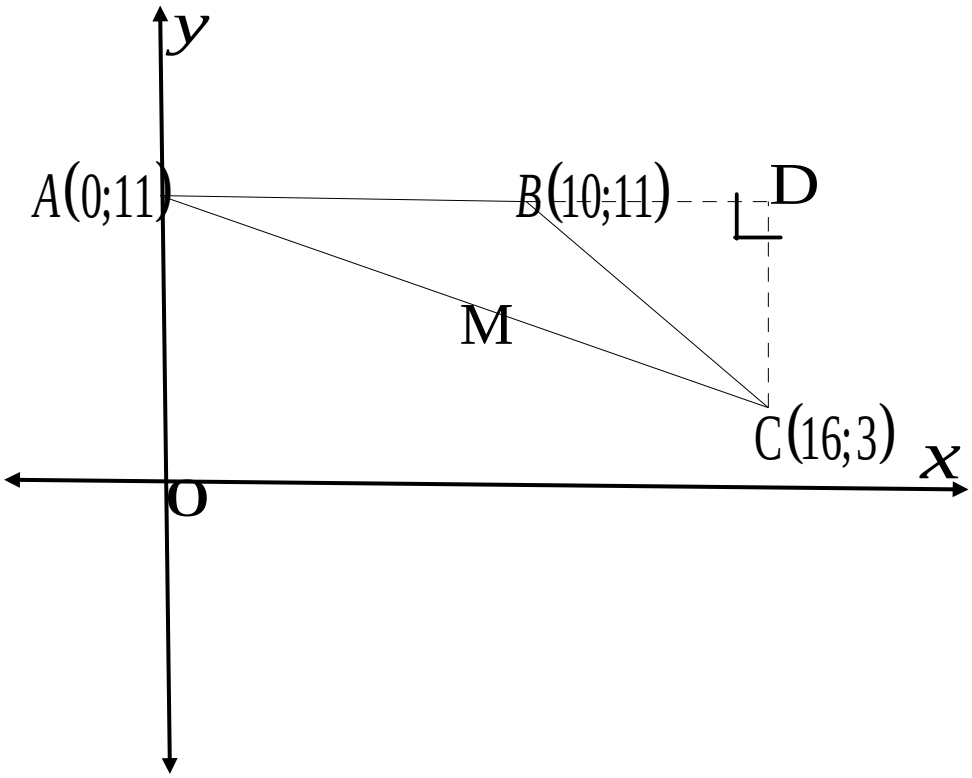
INSTRUCTIONS AND INFORMATION

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, 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

In the diagram below A (0; 11), B(10;11) and C(16;3) are the vertices of Δ ABC, with height CD .



1.1 Write down the length of the line AB. (1)

1.2 Show that ΔABC is isosceles. (3)

1.3 Write down the coordinates of the point D. (2)

1.4 Calculate the area of Δ ABC. (3)

1.5 Determine the coordinates of M, the midpoint of AC. (2)

1.6 Determine the gradient of AC. (2)

1.7 Show that BMCD is a cyclic quadrilateral. (5)

[18]

QUESTION 2

2.1 If $5\cos A + 3 = 0$ and $180° < A < 360°$, without using a calculator and with the aid of a diagram, determine the value of

2.1.1 $\sin A + \cos A$ (4)

2.1.2 $\tan^2 A + 1$ (2)

2.2 If $\sin 61° = \sqrt{p},$ WITHOUT using a calculator, determine the following in terms of $p.$

2.2.1 $\sin 241°$ (2)

2.2.2 $\sin 29°$ (3)

2.3 Prove that $\dfrac{\sin^2 x - \cos^2 x}{\cos x\left[\sin(180° - x) - \cos x\right]} - 1 = \tan x$ (4)

[15]

QUESTION 3

3.1 Simplify fully WITHOUT the use of a calculator:

$$\frac{\tan(180° - x).\cos(360° - x) + \sin(540° + x)}{\cos(90° - x).\cos(-x)}$$ (6)

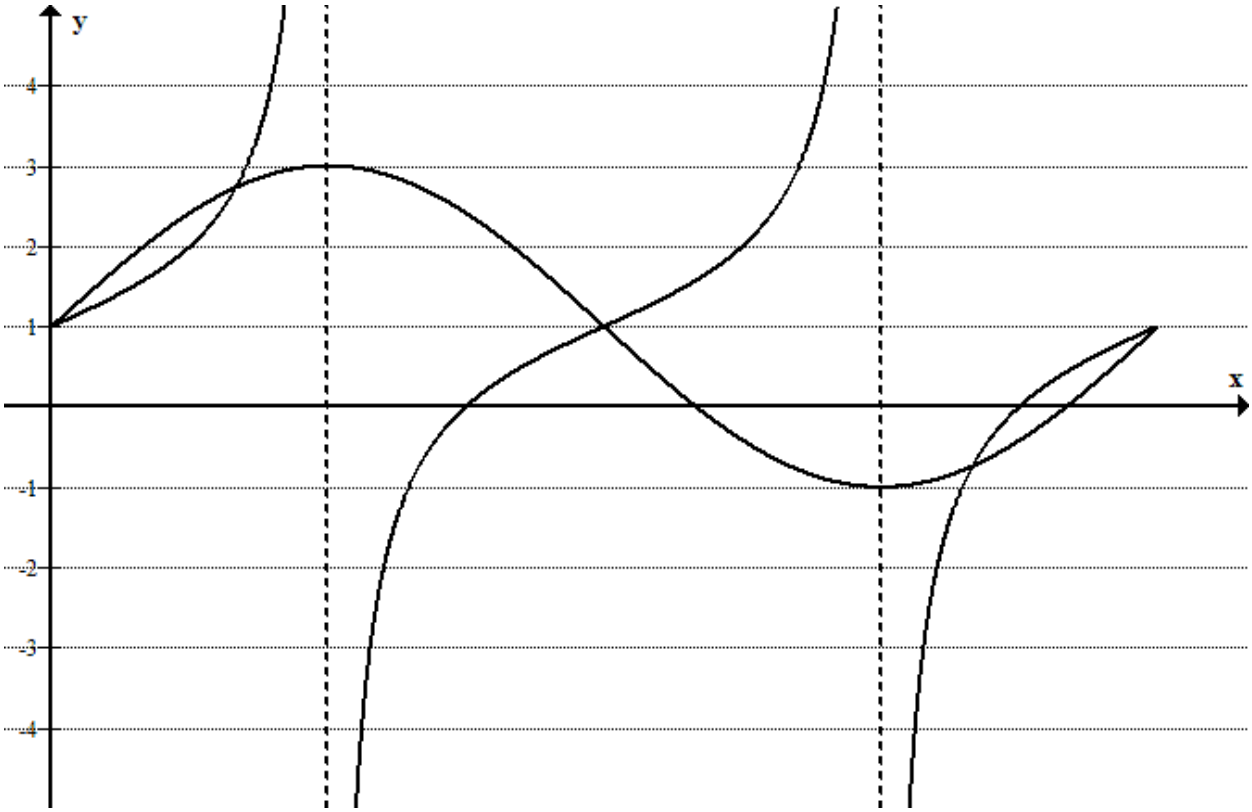
3.2 Determine the general solution of the equation:

$$2\cos^2\theta - \cos\theta = 0$$ (6)

[12]

QUESTION 4

Sketched below are the graphs of $f(x) = \tan(x) + q$ and $g(x) = a\sin(x) + b$. $x \in [0^\circ; 360^\circ]$.



4.1 Determine the values of q, a and b. (4)

4.2 Write down the period of f. (1)

4.3 If $h(x) = -g(x)$, write down the amplitude of h. (1)

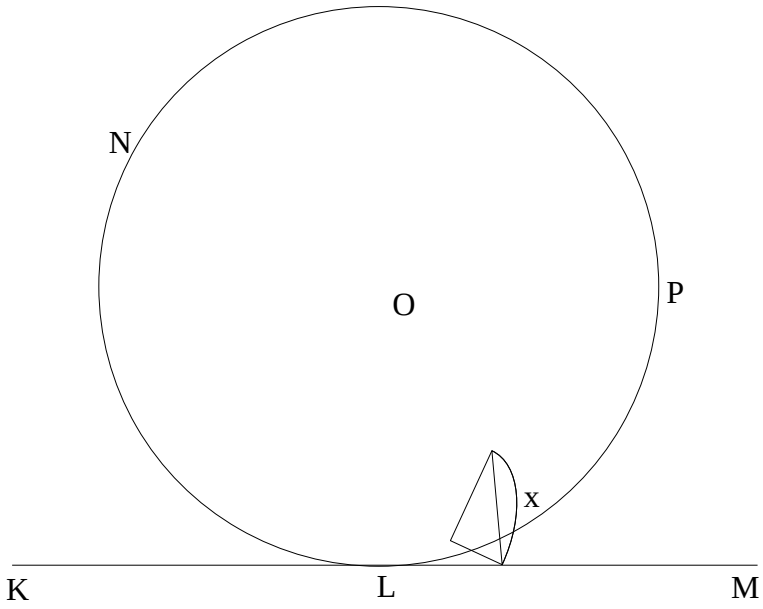
4.4 Calculate the values of x for which $f(x) = g(x)$ for $0^\circ < x < 360^\circ$.
(Show all your calculations) (5)

4.5 Determine the value(s) of x for which g will decrease while f increases for $x \in [0^\circ; 360^\circ]$. (2)

[13]

QUESTION 5

5.1 In the diagram below the circle with centre O passes through L, N and P. KLM is a tangent to the circle at L. NP, NL and LP are joined.



Using the above diagram, prove the theorem that states that $P\hat{L}M = \hat{N}$. (5)

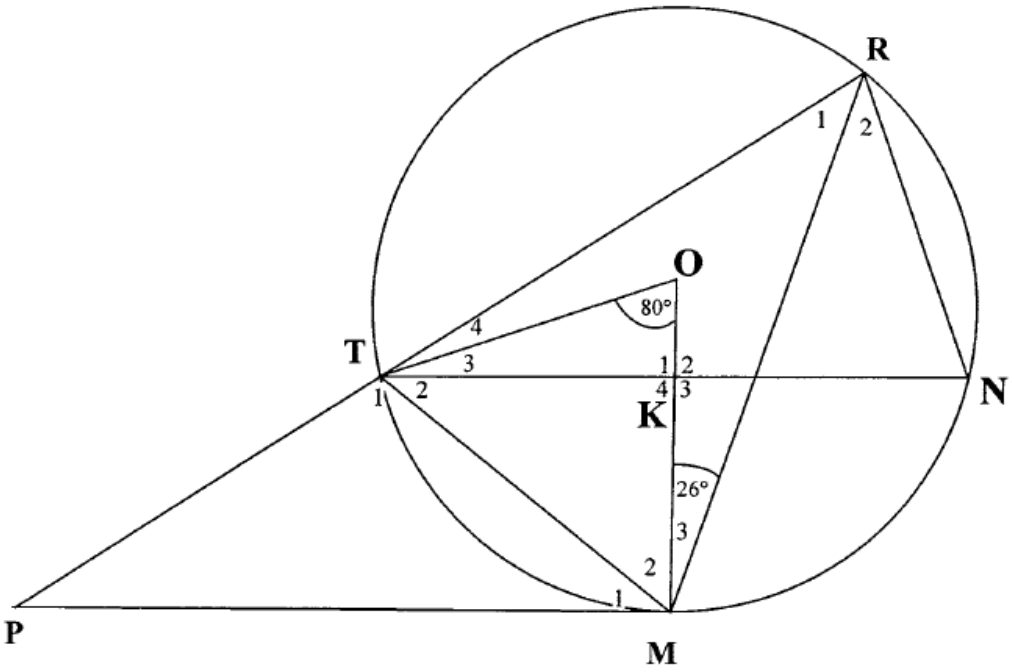
5.2 In the diagram below, O is the centre of circle TRNM. RT produced meets tangent MP at P. OM intersect TN at K. K is the midpoint of TN.

$M\hat{O}T = 80^\circ$

$\hat{M}_3 = 26^\circ$

$TN = 24\ m$

$0K = 5\ m$



5.2.1 Calculate, stating reasons, the size of:

(a) $\hat{P}_1$ (2)

(b) $\hat{M}_1$ (2)

(c) $\hat{N}$ (4)

5.2.2 Prove that TN // PM. (3)

5.2.3 Calculate the length of KM. (3)

[19]

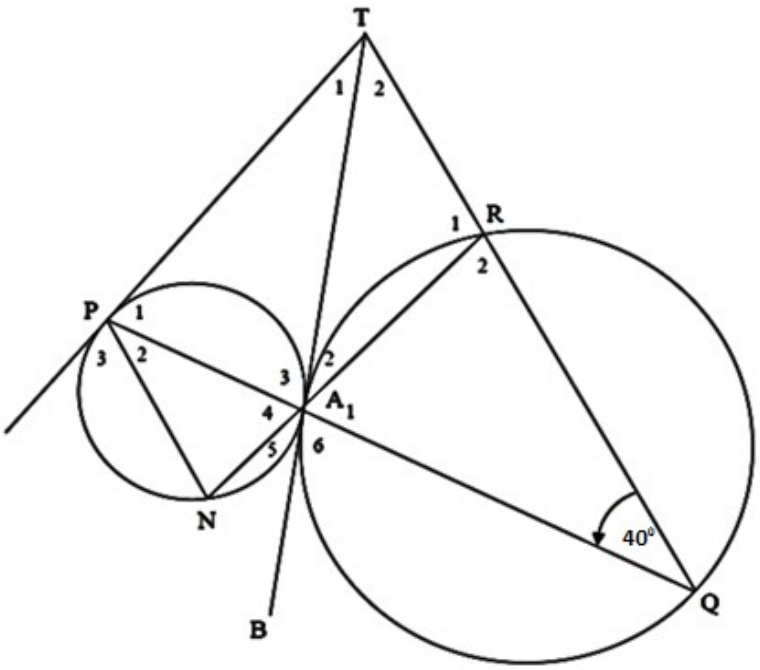
QUESTION 6

6.1 Complete the following statements so that they are true:

6.1.1 If a chord of a circle subtends a right angle on the circumference, then the chord is a … (1)

6.1.2 Opposite interior angles of a cyclic quadrilateral are … (1)

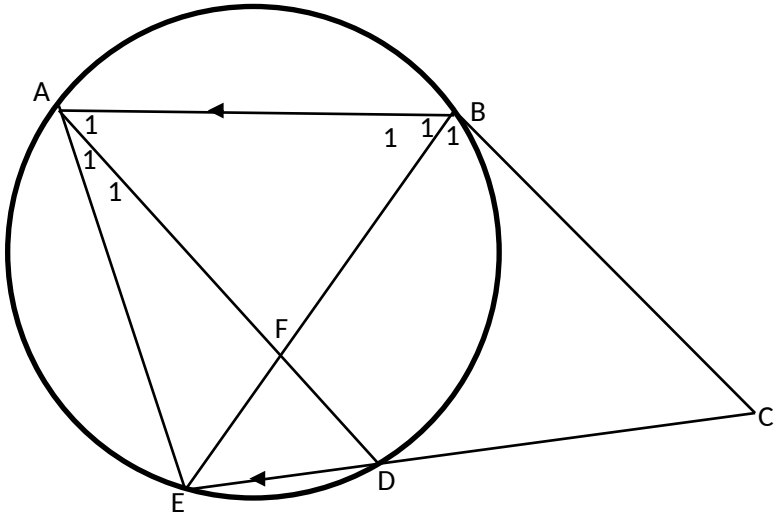
6.2 In the diagram below, two circles have a common tangent TAB.PT is a tangent to the smaller circle.PAQ, QRT and NAR are straight lines. Let $\hat{Q} = 40°$.



6.2.1 Determine, with reasons, THREE other angles equal to 40°. (5)

6.2.2 If $\hat{P}_1 = \hat{A}_4$ prove that PTRN is a parallelogram. (5)

6.3 Tangent BC touches the circle ABDE at B. Chords AD and BE intersect at F. Chord ED is produced to C. AB || EC. It is further given that $\hat{B}_1 = x$ and $\hat{A}_1 = y$.



6.3.1 Determine the size of $\hat{C}$ in terms of x and y. (6)

6.3.2 Becky says that BCDF is not a cyclic quadrilateral while Teboho insists that it is. Who is correct? Show all your working and reasons in determining your answer. (5)

[23]

TOTAL : 100

NAME: ……. CLASS: ……..

DIAGRAM SHEET 1

QUESTION 1

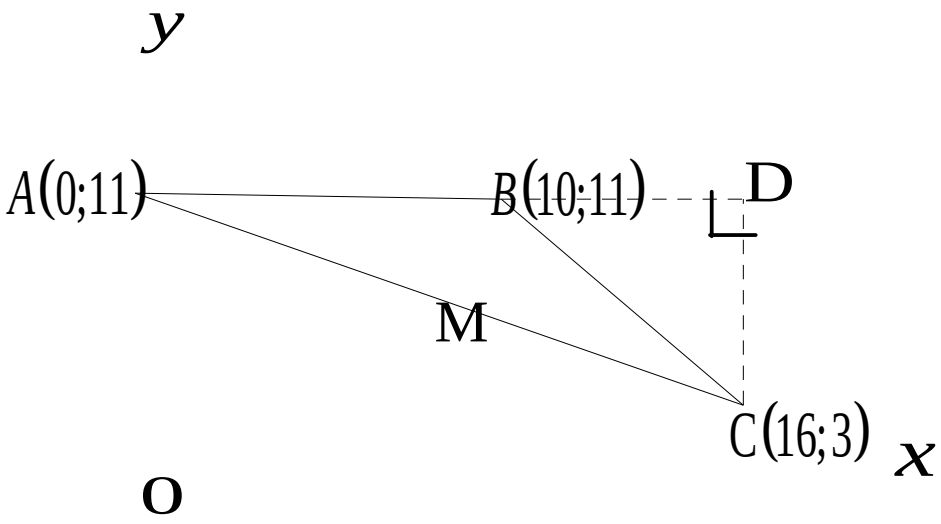


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DIAGRAM SHEET 2

QUESTION 4

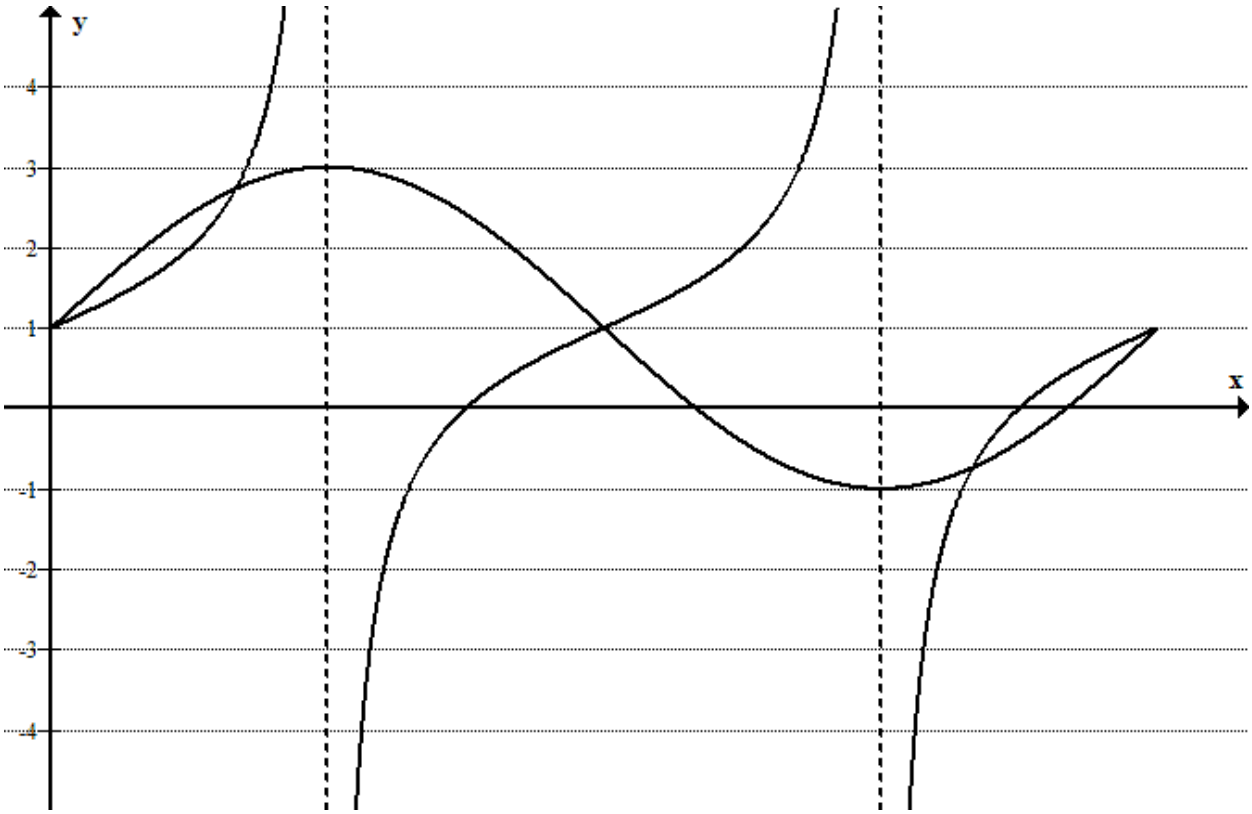

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DIAGRAM SHEET 3

QUESTION 5.1

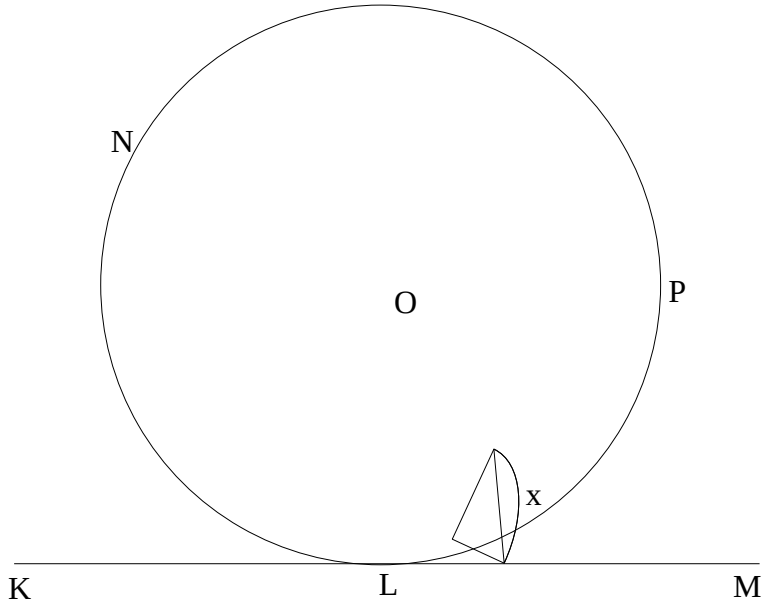

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DIAGRAM SHEET 4

QUESTION 5.2

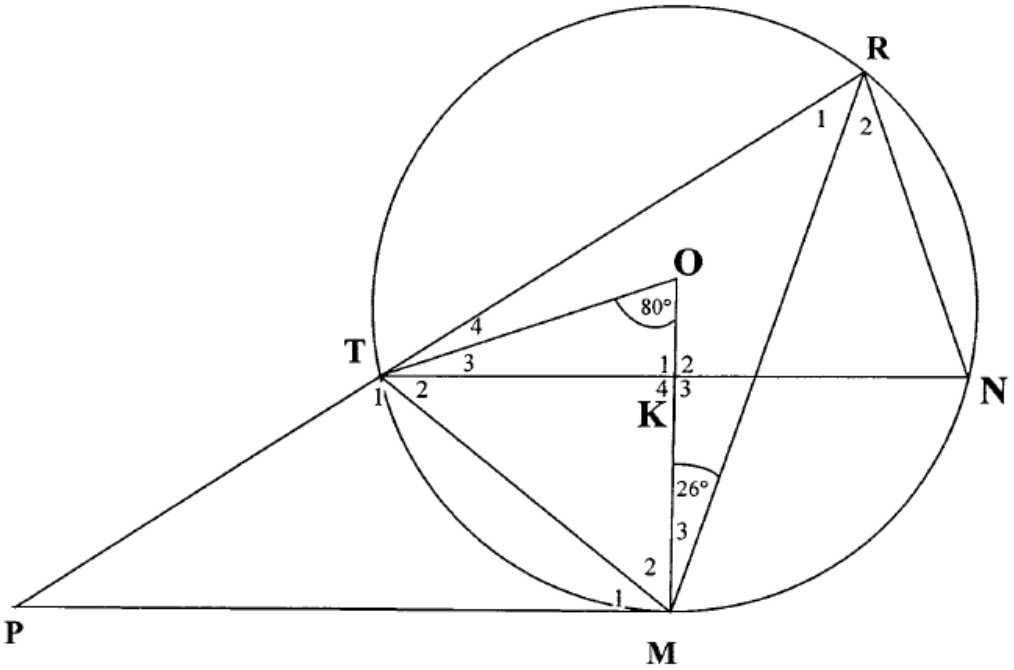

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DIAGRAM SHEET 5

QUESTION 6.2

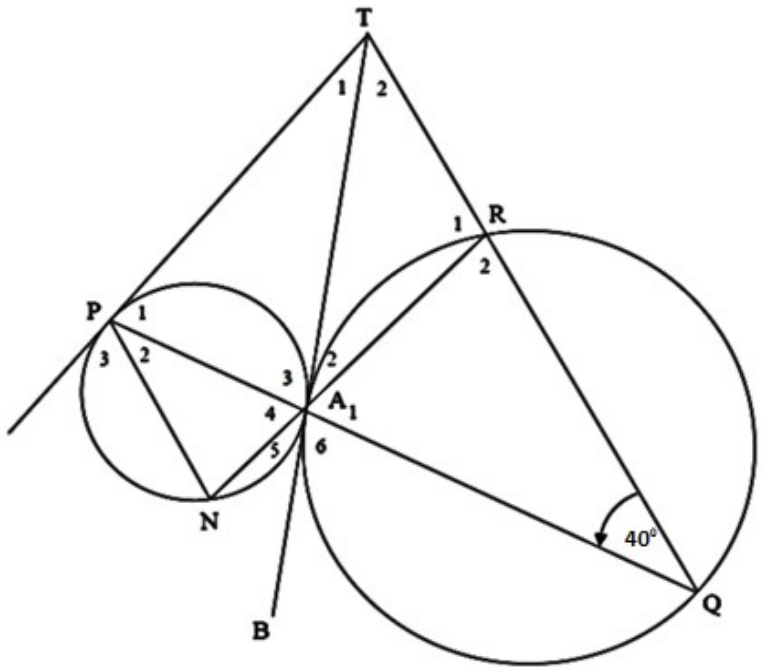

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DIAGRAM SHEET 6

QUESTION 6.3