



Education and Sport Development

Department of Education and Sport Development
Departement van Onderwys en Sport Ontwikkeling
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NORTH WEST PROVINCE

**NATIONAL
SENIOR CERTIFICATE**

GRADE 10

**MATHEMATICS PAPER 2
MID-YEAR EXAMINATION 2017**

MARKS: 75

TIME: 1,5 hours

This question paper consists of 9 pages and a diagram sheet

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. Clearly show ALL calculations, diagrams, graphs, et cetera which you have used in determining the answers.
4. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
5. If necessary, answers should be rounded off to TWO decimal places, unless stated otherwise.
6. Diagrams are NOT necessarily drawn to scale.
7. Number the answers correctly according to the numbering system used in this question paper.
8. Write neatly and legibly.

QUESTION 1

1.1 Determine the value of $\cot 53,4^\circ$ by using a calculator. (2)

1.2 If $\hat{K} = 30^\circ$, $\hat{L} = 50^\circ$ and $\hat{M} = 70^\circ$. Calculate the

numerical value of
$$\frac{\sin(K + L + M)}{\cos^2 7K - \frac{1}{\sin(L + 40^\circ)}} \quad (2)$$

1.3 Determine the value of the following without using a calculator:

$$\sqrt{3} \sin 60^\circ - \sin 45^\circ \cdot \cos 45^\circ \quad (4)$$

[08]**QUESTION 2**

2.1 Calculate the value of θ , where $\theta \in [0^\circ; 90^\circ]$

2.1.1
$$\frac{\sin(2\theta - 40^\circ)}{3} = 0,175 \quad (3)$$

2.2 Find the value of x without using a calculator:

$$x \cdot \sin 60^\circ = \frac{\cos 40^\circ \cdot \sec 40^\circ \cdot \cos 30^\circ}{\tan 45^\circ \cdot \cos 0^\circ} \quad (6)$$

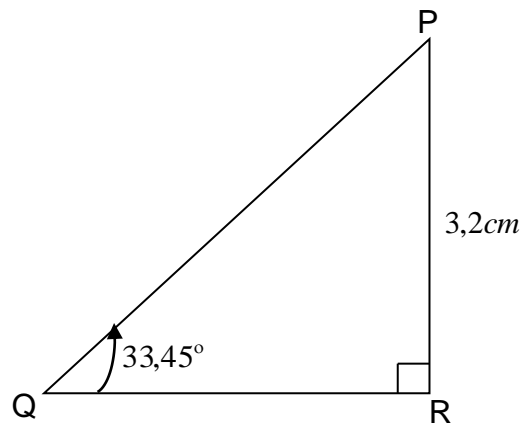
2.3 If $3 \tan A - 4 = 0$ and $\sin A > 0$, determine with the aid of the diagram the value of:

$$10 \sin^2 A + 5 \cos^2 A \quad (5)$$

[14]

QUESTION 3

3.1 In $\triangle PQR$, $\hat{R} = 90^\circ$, $PR = 3,2\text{cm}$ and $\hat{Q} = 33,45^\circ$. Determine:



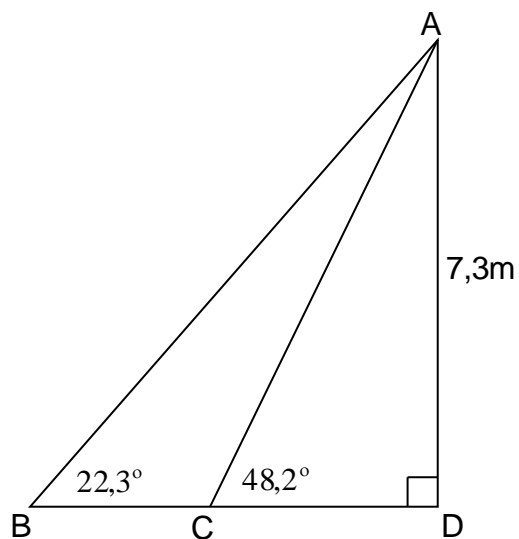
3.1.1 PQ (3)

3.1.2 \hat{P} (2)

3.1.3 QR (3)

3.2 A wall AD is 7,3 m high. B and C are two points in the same horizontal plane as D. The angles of elevation from B and C of A are $22,3^\circ$ and $48,2^\circ$ respectively.

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Determine:

3.2.1 the distance between B and C? (5)

3.2.2 the angle of depression of B from A? (2)

[15]

QUESTION 4

4.1 Sketch graphs of $f(x) = 2 \tan x$ and $g(x) = \sin x + 1$ on the same set of axes for $x \in [0^\circ; 360^\circ]$ using the diagram sheet provided at the end of the question paper. (6)

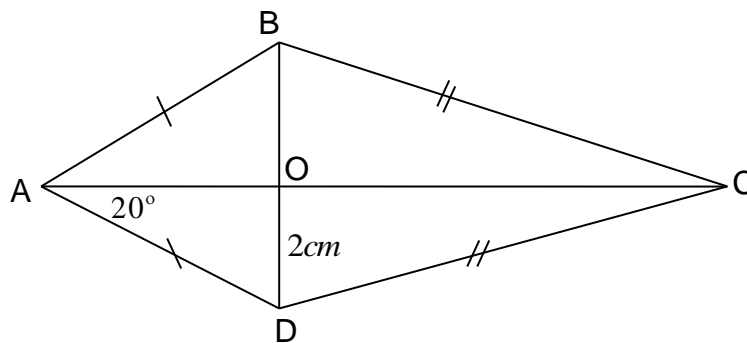
4.1.1 Determine the range of g . (1)

[07]

QUESTION 5

5.1 $ABCD$ is a kite such that the diagonals intersect in O .

$OD = 2$ and $\hat{OAD} = 20^\circ$

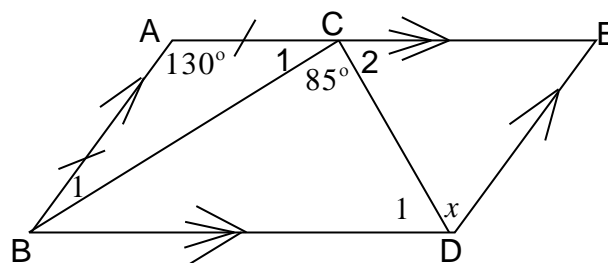


5.1.1 Write down the length of OB . (2)

5.1.2 What is the size of \hat{AOB} ? (2)

5.1.3 What is the size of \hat{BAD} ? (2)

5.2 $ABDE$ is a parallelogram with $\hat{A} = 130^\circ$ and $\hat{BCD} = 85^\circ$. Calculate the value of x in the following diagram :

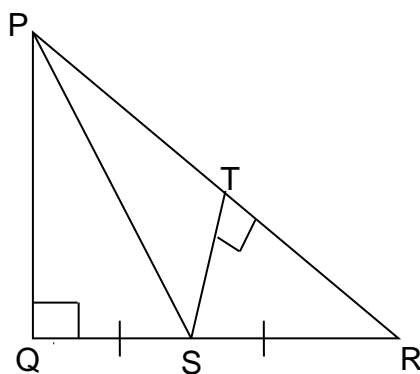


(6)

[12]

QUESTION 6

6.1 In the following figure, $QS = SR$. $\hat{PQR} = \hat{STR} = 90^\circ$.

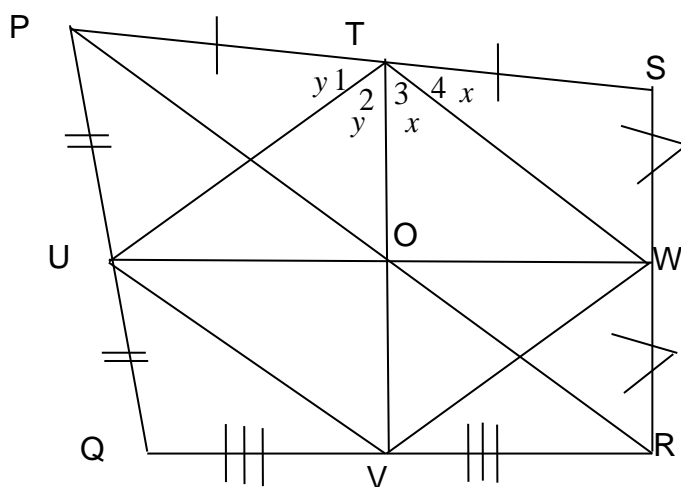


6.1.1 Prove that $PT^2 + QS^2 = PS^2 + TR^2$ (4)

6.1.2 Prove that $\triangle PQR \parallel \triangle STR$ (3)

6.2 In the diagram below:

T, U, V, W are the midpoints of PS, PQ, QR, RS respectively. TW bisects \hat{STV} and TU bisects \hat{PTV} .



Prove that:

6.2.1 $TW \parallel UV$ and $UT \parallel VW$ (4)

6.2.2 $\hat{TUV} = 90^\circ$ (4)

6.2.3 TUVW is a rectangle. (4)

[18]

TOTAL: 75

Learner Name:_____

School Name:_____

Class:_____

Question 4.1

