



## **Education and Sport Development**

Department of Education and Sport Development  
Departement van Onderwys en Sportontwikkeling  
Lefapha la Thuto le Tlhabololo ya Metshameko

**NORTH WEST PROVINCE**

### **PROVINCIAL ASSESSMENT**

**GRADE 10**

**TECHNICAL MATHEMATICS P2**

**JUNE 2019**

**MARKS: 75**

**TIME: 1 hour 30 minutes**

**This question paper consists of 8 pages.**



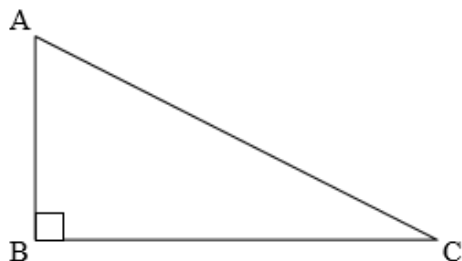
**INSTRUCTIONS AND INFORMATION**

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 In the diagram below,  $\triangle ABC$  is right –angled at B.



Complete the following statements:

1.1.1  $\sin C = \frac{AB}{\dots}$  (1)

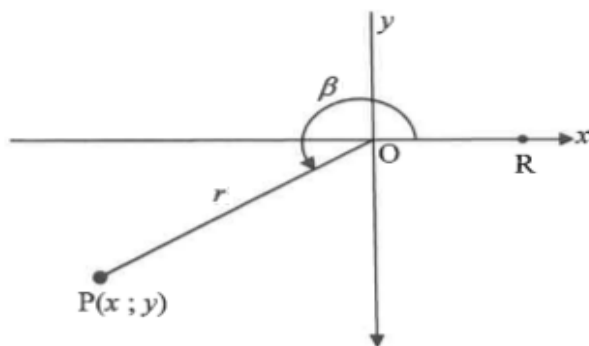
1.1.2  $\dots A = \frac{AB}{BC}$  (1)

- 1.2 If  $x = 38^\circ$  and  $y = 72^\circ$ , by using a calculator, determine the value of:

1.2.1  $\sin x + 2 \cos 3y$  (2)

1.2.2  $3 \tan^2(x + y)$  (2)

- 1.3 In the diagram below,  $P(x; y)$  is a point in the third quadrant.  $\hat{R}OP = \beta$   
and  $\cos \beta = -\frac{15}{17}$



- 1.3.1 Determine the values of  $x$ ,  $y$  and  $r$ . (5)

- 1.3.2 WITHOUT the use of calculator, determine the value of:

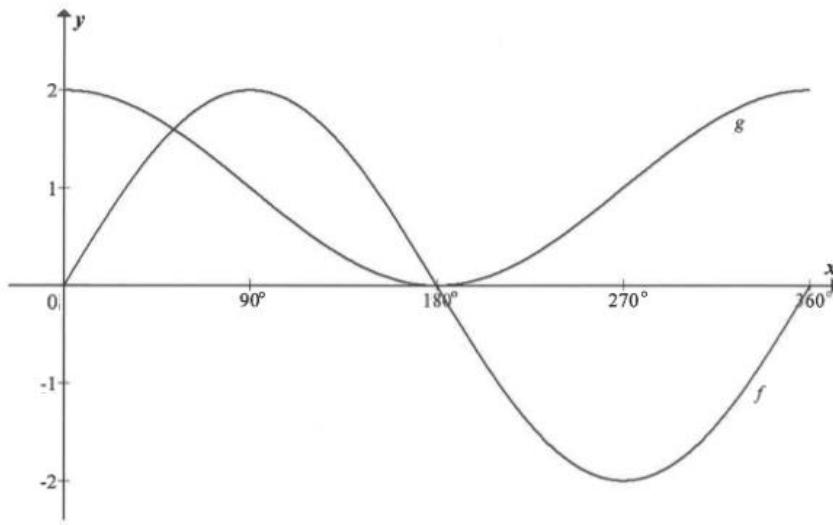
(a)  $\sin \beta$  (1)

(b)  $\cos^2 \beta + \sin^2 \beta$  (3)

[15]

**QUESTION 2**

The graph of  $f(x) = a \sin x$  and  $g(x) = \cos x + 1$  for  $x \in [0; 360]$  are sketched below:

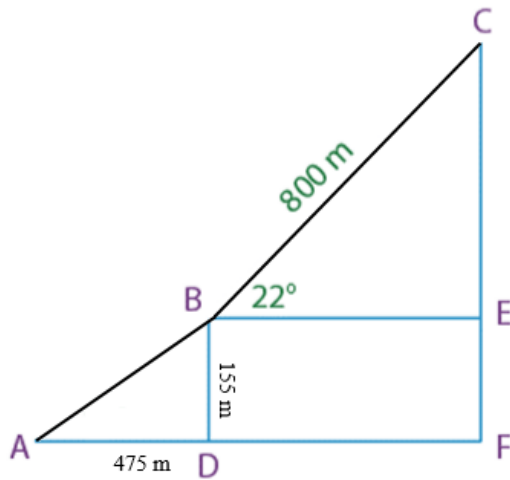


- 2.1 Write down the value of  $a$ . (1)
- 2.2 Write down the period of  $f$ . (1)
- 2.3 Write down the range of  $g$ . (2)
- 2.4 For which values of  $x$  for  $x \in [0; 360]$  will  $f(x) \cdot g(x) > 0$ ? (2)
- 2.5 The graph  $g$  is reflected about the  $x$ -axis and then shifted 2 units upwards to obtain the graph  $h$ . Write down the equation of  $h$ . (2)

**[8]**

**QUESTION 3**

- 3.1 In the diagram below BDFE is a rectangle with  $BD = 155\text{m}$ ,  $AD = 475\text{m}$  and  $BC = 800\text{m}$ . The angle of elevation from B to C is  $22^\circ$ .



Calculate:

- 3.1.1  $\hat{A}$  Round off your answer to the nearest degree. (3)
- 3.1.2 CF (4)
- 3.2 Without the use of a calculator, determine the value of:
- $$\sin^2 45^\circ - \cos 60^\circ + \tan 10^\circ \cdot \cot 10^\circ \quad (5)$$
- 3.3 In each of the following equations, solve for  $x$  where  $0^\circ < x < 90^\circ$ . Give your answers correct to one decimal place.
- 3.3.1  $\cos x = 0,82$  (1)
- 3.3.2  $2\sin 2x = 0,631$  (3)
- 3.3.3  $\tan(x + 20^\circ) = \sin 49,5^\circ$  (3)

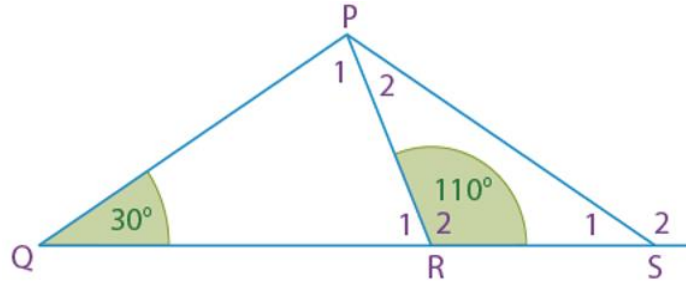
**[19]**

#### QUESTION 4

4.1 Complete the following sentence:

An exterior angle of a triangle is equals to the sum of \_\_\_\_\_ (2)

4.2 In the diagram below  $\hat{Q} = 30^\circ$ ,  $\hat{R}_2 = 110^\circ$  and  $PR = RS$



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

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

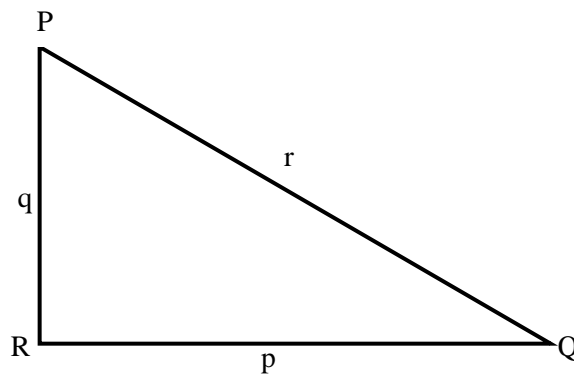
4.2.2  $\hat{P}_2$  (3)

4.2.3 What type of triangle is  $\triangle PRS$  ? (2)

[9]

#### QUESTION 5

5.1 Given  $\triangle PQR$



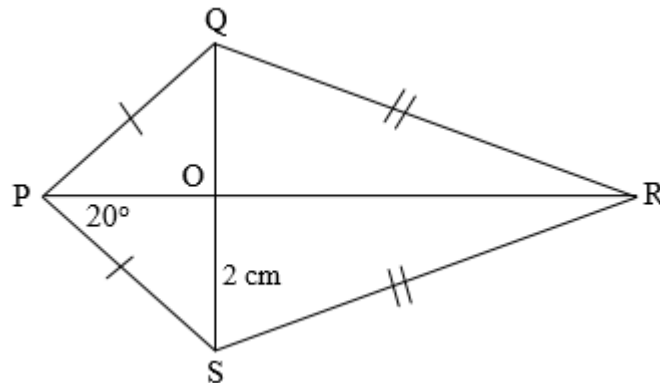
Complete the following sentences:

5.1.1 If  $p^2 + q^2 < r^2$  then  $\triangle PQR$  is \_\_\_\_\_ (1)

5.1.2 If  $p^2 + q^2 = r^2$  then  $\triangle PQR$  is \_\_\_\_\_ (1)

Give reasons for your answers in QUESTIONS 5.2 and 5.3

5.2 PQRS is a kite such that the diagonals intersect in O.  $OS = 2\text{cm}$  and  $\hat{OPS} = 20^\circ$ .

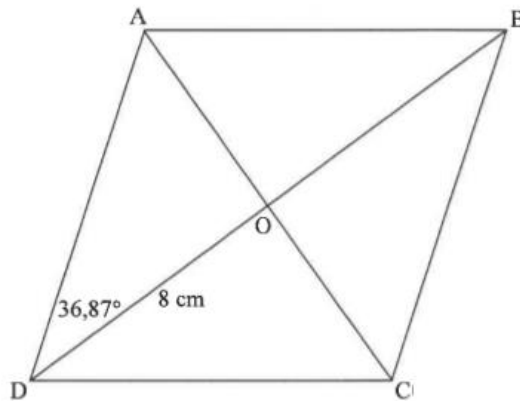


5.2.1 Write down the length of  $OQ$ . (2)

5.2.2 Write down the size of  $\hat{POQ}$ . (2)

5.2.3 Calculate the size of  $\hat{QPS}$ . (2)

5.3 In the diagram, ABCD is a rhombus having diagonals AC and BD intersecting at O.  $\hat{ADO} = 36,87^\circ$  and  $DO = 8\text{cm}$ .



5.3.1 Write down the sizes of the following angles.

(a)  $\hat{CDO}$  (2)

(b)  $\hat{AOD}$  (2)

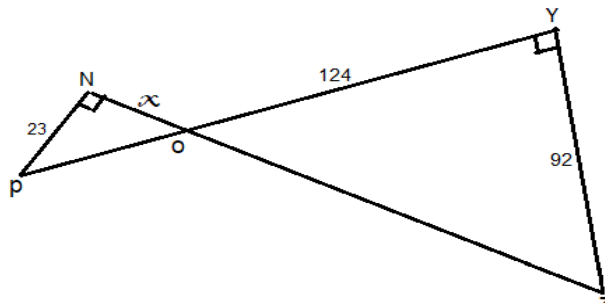
5.3.2 Calculate the length of AO (2)

5.3.3 If E is a point on AB such that  $OE \parallel DA$ , calculate the length of OE. (4)

[18]

**QUESTION 6**

In the diagram below, NZ and PY intersect at O.  $\hat{N} = 90^\circ = \hat{Y}$ . NP = 23 cm, OY = 124 cm and YZ = 92 cm



6.1 Show that  $\triangle PNO \parallel \triangle YZO$ . (3)

6.2 Show that  $x = 31\text{cm}$ . (3)  
[6]

**TOTAL: 75**