GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

PROVINCIAL EXAMINATION

NOVEMBER 2021

GRADE 10

MATHEMATICS
(PAPER 2)

TIME: 2 hours

MARKS: 100

9 pages

INSTRUCTIONS AND INFORMATION

1. This question paper consists of 8 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations, diagrams, graphs etc. that you have used to determine the answers.
4. Present your answers according to the instructions for each question
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. Where necessary, round-off answers to TWO decimal places, unless otherwise stated.
8. Diagrams are NOT necessarily drawn to scale.
9. Number the questions correctly according to the numbering system used in this question paper.
10. Write neatly and legibly.

QUESTION 1

A group of learners at Beacon High School carried out a survey of the number of sweets in 25 packets produced by Dotito brands. Their results are shown in the diagram below.

2	4 6 6 7 7
3	0 0 0 0 0 1 1
3	5 5 5 6 6 7 7
4	0 0 1 1 2 4

Key: 2 | 4 means 24 sweets in a packet

1.1 Write down the modal number of sweets in a packet. (1)

1.2 Determine the following measures of spread:

1.2.1 Median (1)

1.2.2 Lower quartile (1)

1.2.3 Upper quartile (1)

1.3 Calculate the range. (2)

1.4 Give the number of packets of sweets, as a percentage, that have sweets above the upper quartile. (2)
[8]

QUESTION 2

The amounts spent by 120 motorists at KG petrol garage on a certain day were recorded as shown in the table below.

Amount spent (in x Rands)	**Number of Motorists**
$0 < x \leq 50$	12
$50 < x \leq 100$	38
$100 < x \leq 150$	42
$150 < x \leq 200$	20
$200 < x \leq 250$	8

2.1 Write down the interval that has the least number of motorists. (1)

2.2 Draw a histogram to represent the data. (2)

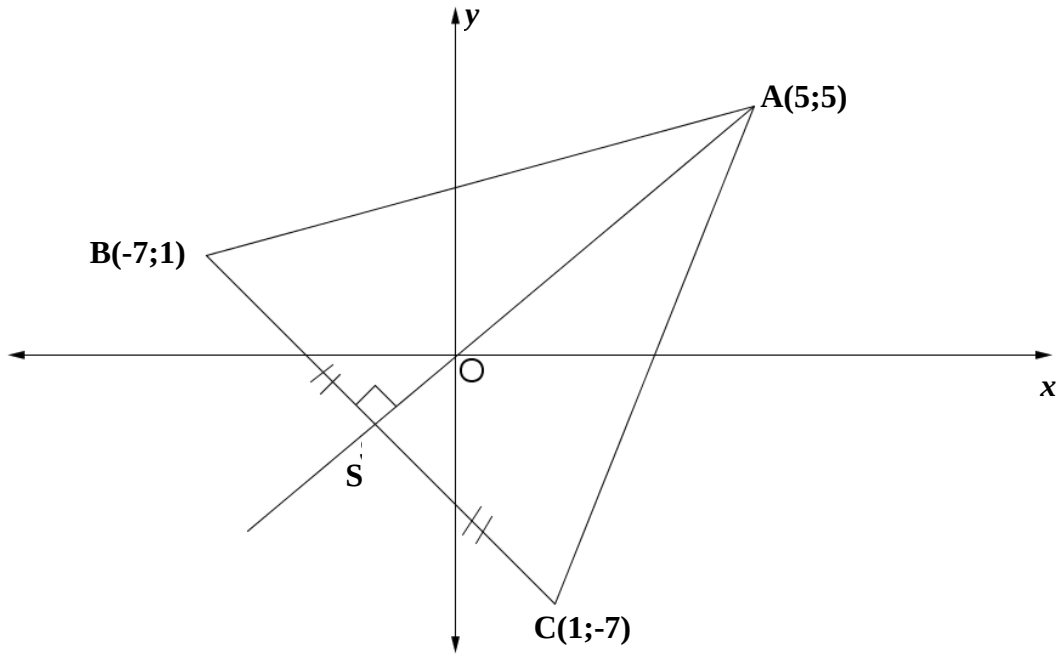
2.3 Identify in which interval the thirtieth (30^{th}) percentile lies. (2)

2.4 Calculate the size of the angle that will represent the modal class on a pie chart. (2)
[7]

QUESTION 3

In the Cartesian Plane below, points **A**(5; 5), **B**(–7; 1) and **C**(1; –7) are the vertices of a triangle.

Point **S** is the midpoint of **BC**. The line **AS** is perpendicular to **BC**.



3.1 Determine the coordinates of point **S**. (3)

3.2 Determine the gradient of the line **AC**. (2)

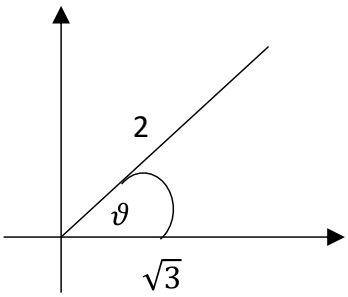
3.3 Determine the distance of **BC**. (3)

3.4 Determine the area of ΔABC . (5)

[13]

QUESTION 4

4.1



Using the diagram above and without the use of a calculator, determine the value of:

4.1.1 $\sin\theta$ (3)

4.1.2 $\sin\theta\cos\theta$ (2)

4.2 If $x = 60°$ and $y = 45°$, determine the value of the following, without the use of a calculator:

$\frac{1}{2}sin\ 2y - [2\ tan^2\left(\frac{x}{2}\right)]\cos\ x$ (6)

4.3 Determine the acute angle β, to 2 decimals:

4.3.1 $\sin(\beta - 17.8°) = 0{,}215$ (3)

4.3.2 $\tan 3\beta = \sqrt{3}$ (2)

4.3.3 $3\sin\frac{\beta}{2} = 2{,}012$ (3)

4.4 Determine the value of the expression, without using a calculator.

$$\frac{tan30°.cosec\ 60°}{cot45°.sin^2\ 45°}$$ (4)

[23]

QUESTION 5

5.1 The following are given:

- $7\sin x = 4$ where $(x < 90°)$
- $\tan y = t$
- x and y are complementary angles.

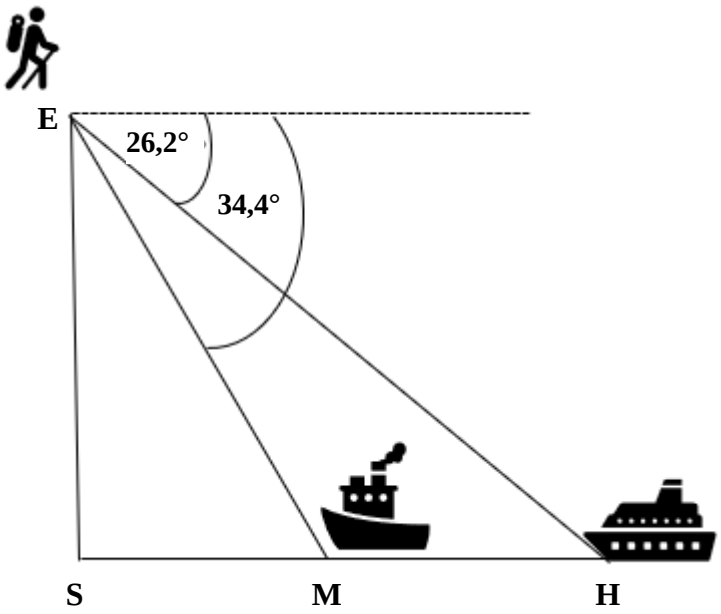
Determine the value of t^2, without the use of a calculator and with the aid of a sketch. (6)

5.2 Assume that $sin^2\, x + cos^2 x = 1$ for all values of x. Now simplify the following expressions:

5.2.1 $1 - cos^2 x - sin^2\, x$ (3)

5.2.2 $cos^2 x + \tan x . cot x + sin^2\, x$ (3)

5.3



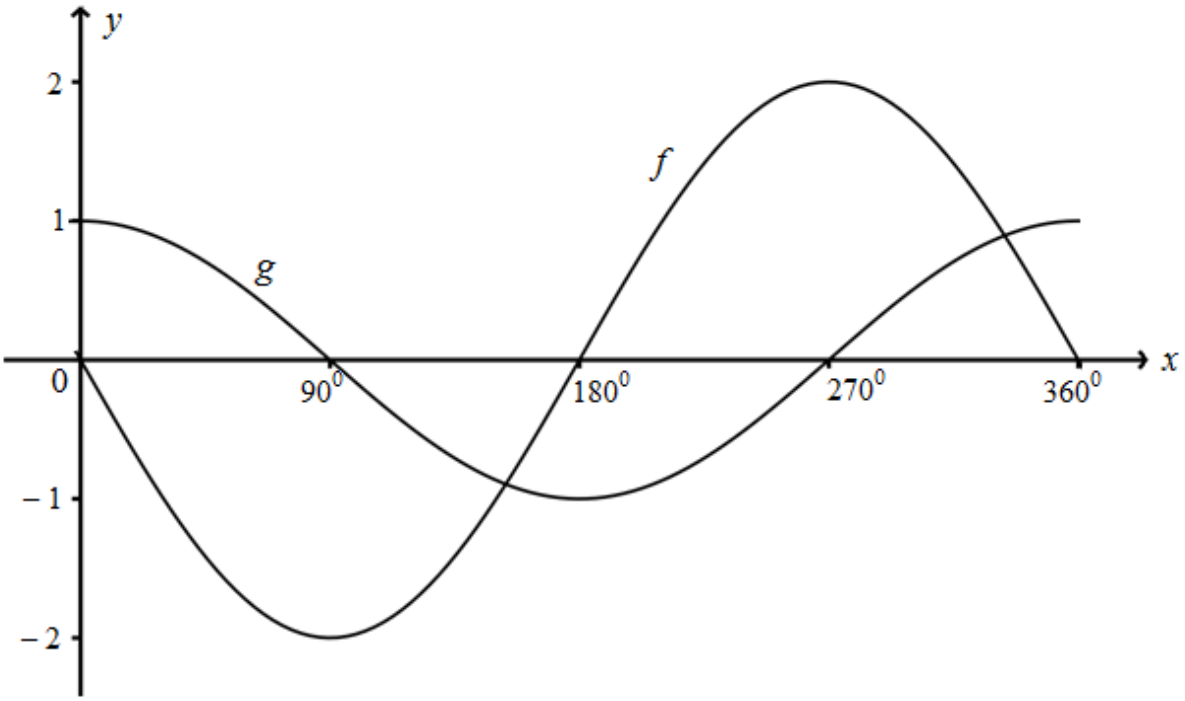
From the top of the lighthouse, 55 m above sea level, two boats **M** and **H**, sailing due east, have angles of depression of 26,2° and 34,4° as shown.

Calculate the distance between the two boats. (5)

[17]

QUESTION 6

The diagram below represents the graphs of $f(x) = a \sin x$ and $g(x) = b \cos x$ for $x \in [0° ; 360°]$.



6.1 Write down the values of a and b. (2)

6.2 For which value(s) of x will g be a decreasing function? (2)

6.3 What is the amplitude of f? (1)

6.4 What is the range of g? (2)

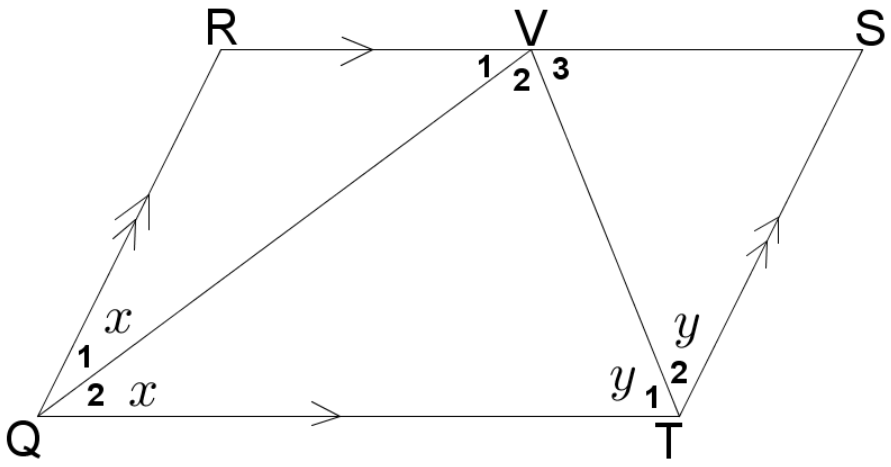
6.5 For which value(s) of x is $f(x) - g(x) = 2$ (2)

[9]

QUESTION 7

In the sketch, RSTQ is a parallelogram with RS // QT and QR // TS.

VQ bisects $R\hat{Q}T$ and VT bisects $Q\hat{T}S$.



Prove that :

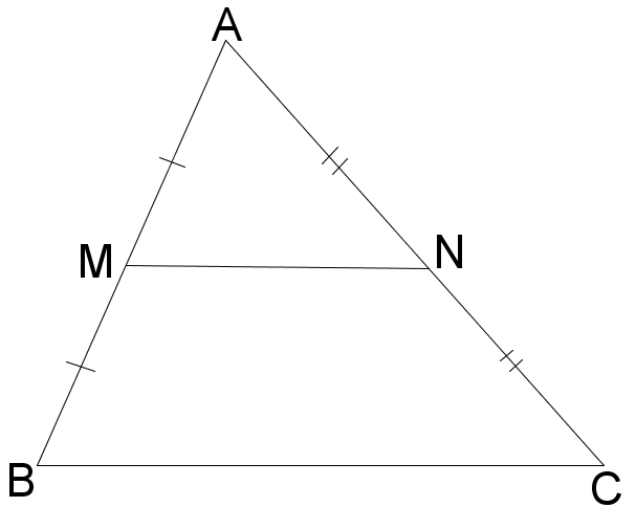
7.1 $\hat{V}_2 = 90°$ (5)

7.2 RS = 2RQ (6)

[11]

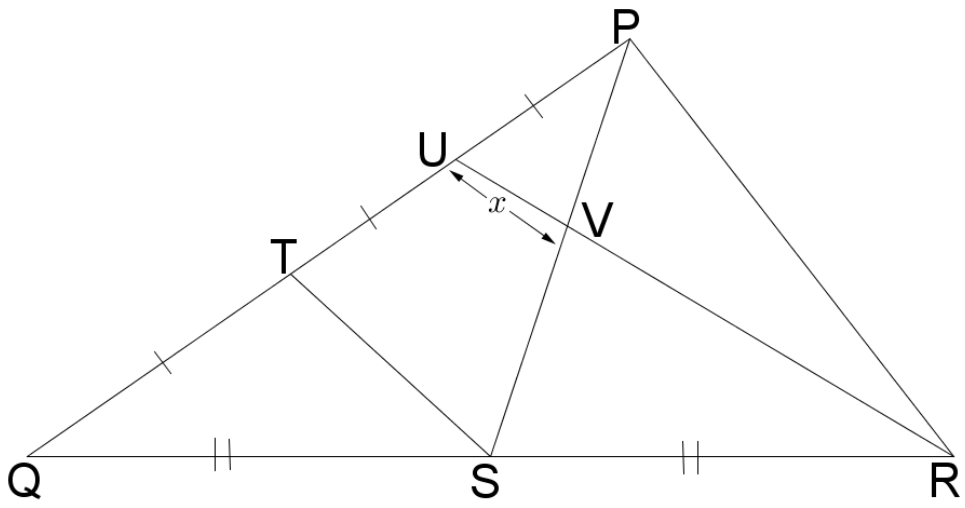
QUESTION 8

8.1 In ΔABC , **M** and **N** are the midpoints of **AB** and **AC** respectively.



Prove the theorem that states that **MN** // **BC**. (6)

8.2 In ΔPQR, **QT** = **TU** = **UP**. **QS** = **SR** and **UV** = $x\ cm$.



Determine the length of **VR** in terms of x. (6)

[12]

TOTAL: 100

END