HILLCREST HIGH SCHOOL

GRADE 10 **NOVEMBER 2015**

MATHEMATICS
PAPER 2

TIME : 2 Hours **MARKS : 100**

EXAMINER : MR REUBEN
MODERATOR : MRS MOODLEY

INSTRUCTIONS TO CANDIDATES

1. This paper consists of 10 questions. Answer ALL questions.
2. **ALL CALCULATIONS MUST BE SHOWN CLEARLY.**
3. An approved calculator (non-programmable and non-graphical) may be used unless otherwise stated.
4. All final answers must be rounded off correct to TWO decimal places unless stated otherwise.
5. Diagrams are not necessarily drawn to scale.
6. Write neatly and legibly.

Formulae

$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$ $m = \frac{y_2 - y_1}{x_2 - x_1}$ $M = \left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$

$y - y_1 = m(x - x_1)$ $y = mx + c$

This question paper consists of 7 pages.

Question 1

Use the data in the table below to answer the questions that follow :

8	30	12	26	24	13	10	4	18	31
19	7	25	18	17	9	10	13	19	

1.1 Determine the mean of the given data. (2)
1.2 Rearrange the data in ascending order and determine the median. (2)
1.3 Determine the lower and upper quartiles, Q_1 *and* Q_3. (2)
1.4 Draw a box and whisker plot to represent the data. (4)
[10]

Question 2

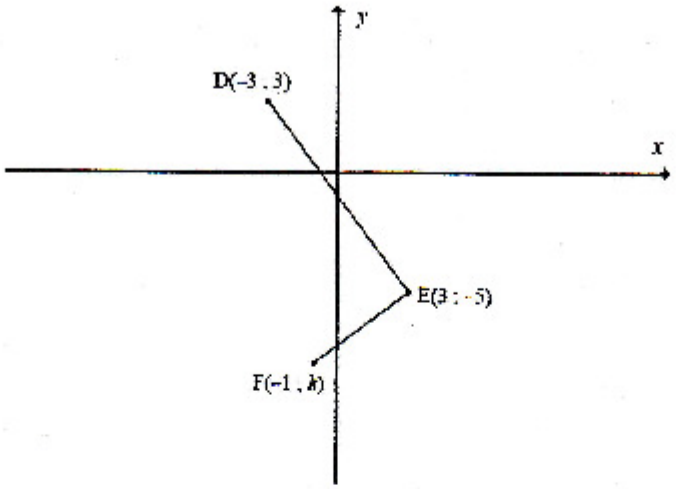
The table shows the record of the marks of 60 learners, arranged in intervals.

Mark interval	Frequency
$1 \leq x < 10$	5
$11 \leq x < 20$	6
$21 \leq x < 30$	21
$31 \leq x < 40$	18
$41 \leq x < 50$	10

2.1 Calculate the approximate mean mark. (4)
2.2 Which interval is the modal interval ? (1)
2.3 In which interval does the median lie ? (2)
[7]

Question 3

In the diagram below, D(−3 ; 3), E(3 ; −5) and F(−1 ; k) are three points in the Cartesian plane.



3.1 Calculate the length of DE. (2)

3.2 Calculate the gradient of DE. (2)

3.3 Determine the value of k if $\angle DEF = 90°$. (4)

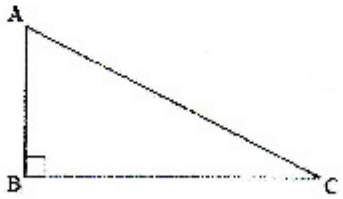
3.4 If $k = -8$, determine the coordinates of M, the midpoint of DF. (2)

3.5 Determine the coordinates of a point G such that the DEFG is a rectangle. (4)

[14]

QUESTION 4

4.1 In the diagram below, ΔABC is right-angled at B.



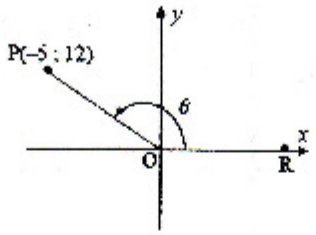
Complete the following statements:

4.1.1 $\sin C = \frac{AB}{\ldots}$ (1)

4.1.2 $\ldots A = \frac{AB}{BC}$ (1)

4.2 Without using a calculator, determine the value of: $\frac{\sin 60° . \tan 30°}{\sec 45°}$ (4)

4.3 In the diagram P(–5 ; 12) is a point in the Cartesian plane and $R\hat{O}P = \theta$.



Determine the value of:

4.3.1 $\cos\theta$ (3)

4.3.2 $\text{cosec}^2\theta + 1$ (3)
[12]

Question 5

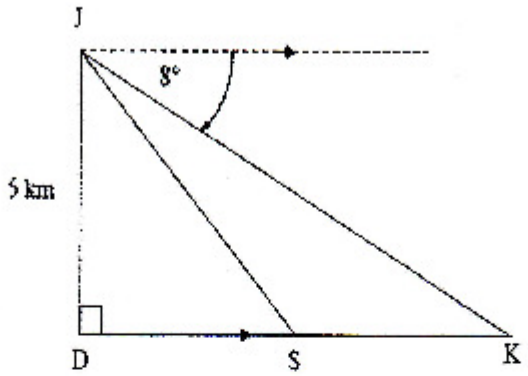
5.1 If A= 100° and B = 67,5°, calculate correct to THREE decimal digits:

5.1.1 $\tan(A-B)$ (1)
5.1.2 $2\cos(A+B)$ (2)
5.1.3 Cosec2B (2)

5.2 Solve for x, correct to ONE decimal place , if $x \in [0°; 90°]$

5.2.1 $2\cos x = 0{,}46$ (2)
5.2.2 $\sin(x - 20°) = 0{,}6$ (2)
5.2.3 $\tan 2x - 1{,}5 = -0{,}5$ (2)

5.3 An aeroplane at J is flying directly over a point D on the ground at a height of 5 kilometres. It is heading to land at point K. The angle of depression from J to K is 8°. S is a point along the route from D to K.



5.3.1 Write down the size of $\angle JKD$. (1)

5.3.2 Calculate the distance DK, correct to the nearest metre. (3)

5.3.3 If the distance SK is 8 kilometres , calculate the distance DS. (1)

5.3.4 Calculate the angle of elevation from point S to J, correct to ONE decimal place. (2)

[18]

Question 6

6.1 On the same system of axes on the DIAGRAM SHEET, sketch the graphs of $f(x) = 2\cos x - 1$ and $g(x) = \tan x$ for $x \in [0°; 360°]$ (6)

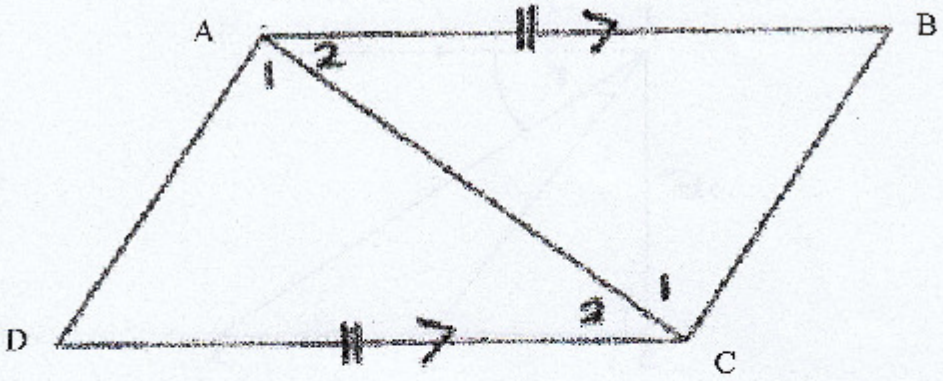
6.2 Write down the range of f(x). (2)

6.3 Use your graph to determine the value(s) of x for which f(x) = g(x) (2)

[10]

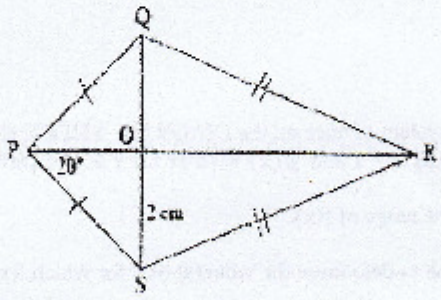
Question 7

Use the diagram below to prove the theorem that states that in a quadrilateral, if one pair of opposite sides is equal and parallel, then it is a parallelogram. [6]



QUESTION 8

PQRS is a kite such that the diagonals intersect in O.
OS = 2 cm and $O\hat{P}S = 20°$.



8.1 Write down the length of OQ. (Give a reason for your answer) (2)

8.2 Write down the size of $P\hat{O}Q$. (Give a reason for your answer) (2)

8.3 Write down the size of $Q\hat{P}S$. (Give a reason for your answer) (2)

[6]