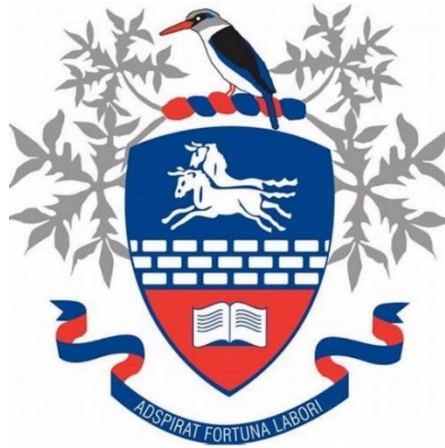


HILLCREST HIGH SCHOOL



HILLCREST HIGH SCHOOL INTERNAL ASSESSMENT

GRADE 10

MATHEMATICS

JUNE 2022

MARKS: 100

TIME: 2 hours

NAME: _____

Mac Tavish	Victor	Alborough	Oosthuyzen	Reuben	Woodrow
EXAMINER	MODERATOR				

This question paper consists of 12 pages.

QUESTION	1	2	3	4	5	6	7	TOTAL
MARK	16	17	10	12	17	18	10	100
MARKS								
MARKER								

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question and answer booklet consists of **7** questions and **12** pages.
2. Read the questions carefully.
3. Answer **ALL** the questions.
4. Number your answers exactly as the questions are numbered.
5. Clearly show **ALL** calculations, diagrams, graphs, etc. which you have used in determining your answers.
6. Answers only will **NOT** necessarily be awarded full marks.
7. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
8. If necessary, round off answers correct to **TWO** decimal places, unless stated otherwise.
9. Diagrams are **NOT** necessarily drawn to scale.
10. Write neatly and legibly.

FORMULA

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$M\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c$$

$$y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

QUESTION 1

1.1 Factorise each of the following, as far as possible:

1.1.1 $x(x-1)+(x-1)$ (2)

1.1.2 $6x^2+11x-10$ (2)

1.1.3 $x^2+b^2-2xb-a^2$ (3)

1.2 Simplify:

1.2.1 $(x-4y)(x^2-3xy+5y)$ (3)

1.2.2 $\frac{3^2x^{-2}y^0}{3^{-1}x^{-3}}$ (2)

1.2.3 $\frac{10^x \cdot 25^{x+1}}{50^{x-1} \cdot 5^{x+3}}$ (4)

QUESTION 2

2.1 Determine, without the use of a calculator, the value of x :

2.1.1 $x^2 + 6x = 27$ (3)

2.1.2 $3^{x+1} = \frac{1}{9}$ (3)

2.1.3 $\frac{x-1}{x-2} - \frac{x}{x-1} = \frac{2x}{x^2-3x+2}$ (4)

2.2 Solve simultaneously for both x and y : $x + 2y = 1$ and $2x + 3y = 6$ (4)

- 2.3 If the area of a particular square is given as $4x^2 - 40x + 100$ square units, determine the value of x for which the perimeter of the square will be 32 units. Show all your working. (3)

[17]

QUESTION 3

- 3.1 Consider the following sequence: 6 ; 10 ; 14 ; 18 ; ...

- 3.1.1 Write down the next TWO terms. (1)

- 3.1.2 Find the general term (T_n). (2)

- 3.1.3 Determine the 45th term (T_{45}). (2)

- 3.1.4 Which term of the sequence has the value 626? (2)

- 3.2 The multiples of 5 create the pattern 5 ; 10 ; 15 ; 20 which continues.

- 3.2.1 Write down the next number in the pattern. (1)

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- 3.2.3 Determine the 13th ODD number in this pattern. (2)

[10]

QUESTION 4

4.1 Identify the quadrilateral that has:

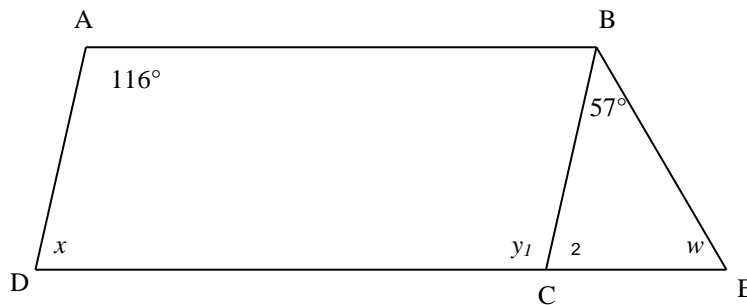
4.1.1 one pair of opposite angles equal. (1)

4.1.2 two diagonals that divide the quadrilateral into four congruent triangles. (1)

4.1.3 diagonals that bisect the opposite angles. (1)

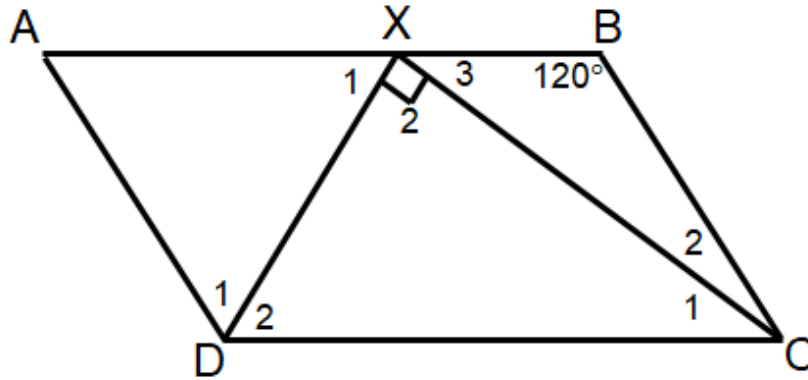
4.1.4 diagonals that are equal in length, but are not perpendicular to each other. (1)

4.2 ABCD is a parallelogram. $\hat{A} = 116^\circ$ and $\hat{CBE} = 57^\circ$



Give, with reasons, the values of x , y and w . (3)

4.3 $ABCD$ is a parallelogram. DX bisects \widehat{ADC} . $\widehat{DXC} = 90^\circ$. $\widehat{B} = 120^\circ$



Calculate, with reasons, the size of:

4.3.1 \widehat{XCD} (3)

4.3.2 \widehat{XCB} (2)

[12]

5.3 Determine the gradient of QM.

(2)

5.4 Show that PN and KM bisect each other.

(3)

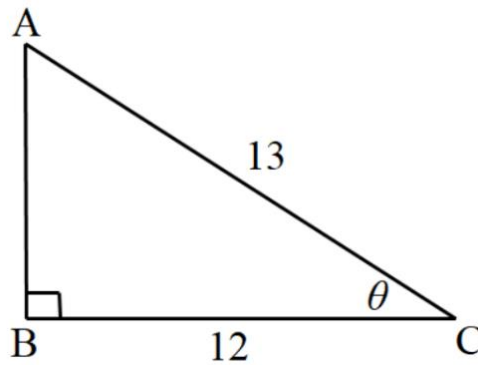
5.5 Show that $\hat{KPM} = 90^\circ$

(3)

[17]

QUESTION 6

6.1 In the given sketch, $BC = 12$ units, $AC = 13$ units and $\hat{A}BC = 90^\circ$.



Without using a calculator, determine the value of the following:

6.1.1 AB (1)

6.1.2 $\sin \theta$ (2)

6.1.3 $2 \tan \theta$ (2)

6.1.4 $\cos^2 \theta$ (2)

6.1.5 θ (2)

6.1.6 $\cos(90^\circ - \theta)$ (2)

6.2 Solve the following equations for $x \in [0^\circ ; 90^\circ]$.

6.2.1 $2 \sin x = 0,85$ (2)

6.2.2 $\tan(2\theta + 35^\circ) = 1,44$ (3)

6.3 Use a calculator to evaluate the following expressions, correct to 2 decimal places:

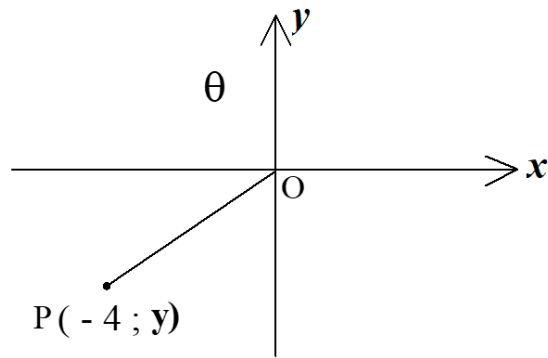
6.3.1 $\cot 10^\circ + \sqrt{\cos^2 85^\circ}$ (1)

6.3.2 $5 \operatorname{cosec} 5x$ if $x = 99^\circ$ (1)

[18]

QUESTION 7

7.1



Using the diagram above, with $OP = \sqrt{65}$, and without the use of a calculator, find the value of:

7.1.1 y (2)

7.1.2 $\sin \theta$ (2)

7.1.3 $2\sec \theta - \tan^2 \theta$ (3)

7.2 Without a calculator, determine:

$$4\sin 30^\circ - 2\cos 60^\circ + \sqrt{\tan^2 45^\circ + 3} \quad (3)$$

TOTAL: [10]
[100]