Hillcrest High School

GRADE 10

MATHEMATICS

JUNE EXAM 2015

MARKS: 100 TIME: 2 HOUR

EXAMINER: Mr Dunlop MODERATOR: Mrs Moodley

INSTRUCTIONS AND INFORMATION FOR CANDIDATES

1. This paper consists of 10 questions. Answer ALL the questions.
2. Write your name and **your Mathematics teacher's** name on your answer page.
3. Clearly show all calculations, diagrams, graphs, etc. you have used to determine your answer.
4. An approved scientific (non-programmable) calculator may be used, unless otherwise stated.
5. If necessary, answers should be rounded off to TWO decimal digits, unless stated otherwise.
6. Number the answers EXACTLY as the questions are numbered.
7. Diagrams are not necessarily drawn to scale.
8. It is in your own interest to write legibly and to present your work neatly.

QUESTION 1:

1. 1 Write the answers for the following only:

1.1.1. Round off 9,2749 correct to 2 decimal places. (1)

1.1.2. Any number to the power of zero is equal to _____? (1)

1.2 If $x \in \{-17; -8; 0; 8; 17\}$, for what values of x will $\sqrt{\frac{81}{17-x}}$ be :

1.2.1. A natural number (1)

1.2.2. A rational number (1)

1.2.3. An irrational number (1)

1.2.4. Undefined (1)

1.3. Between which two integers will $\sqrt{42}$ lie (2)
[8]

QUESTION 2:

Multiply out and simplify the following:

2.1. $(4x - 5y)(4x + 5y)$ (2)

2.2. $(3x - 7y)^2$ (3)

2.3. $(2x - 3)(4x^2 - 5x - 7)$ (5)
[10]

QUESTION 3:

Factorise the following fully:

3.1. $3m + 3n - tm - tn$ (2)

3.2. $8x^3 - 27$ (3)

3.3. $30x^2 - 69x + 36$ (3)
[8]

QUESTION 4:

Simplify the following fully, leave your answers with positive indices.

$$\frac{3.x^3y^{-2} \times 27x^{-7}y^6}{(3x^{-2}y^3)^2}$$ [4]

QUESTION 5:

Simplify the following fractions fully:

5.1. $\frac{4x-y}{y} - \frac{x-3y}{x}$ (3)

5.2. $\frac{x^2-36}{x^2-12x+36}$ (3)

[6]

QUESTION 6:

Solve for the unknown in each of the following equations:

6.1. $\frac{2x+1}{3} - \frac{x-2}{4} = 9\frac{1}{6}$ (5)

6.2. $x^2 - 5x = 0$ (2)

6.3. $x^2 + 7x = 8$ (3)

6.4. $3^x = 81$ (2)

6.5. $5.\ 2^{x-3} = 320$ (3)

[15]

QUESTION 7:

Solve the following two equations simultaneously:

$3x - 4y = 5$ and $x + 4y = 7$ [5]

QUESTION 8:

Consider the following number pattern; 4; -3; -10; …...

8.1. Write down the next two numbers in this sequence. (2)

8.2. Give the formula for the general term in the sequence, Tn = … (2)

8.3. Which term in the sequence has the value of -290 ? (2)

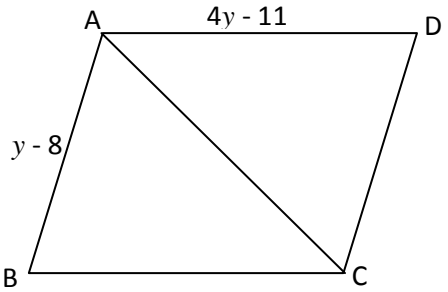
8.4. Is -114 a term in this sequence? Justify your answer. (3)

[9]

QUESTION 9:

9.1. ANSWER ON DIAGRAM SHEET 1.
Use the parallelogram provided on DIAGRAM SHEET 1 to prove the theorem which states that the diagonals of a parallelogram bisect each other. (8)

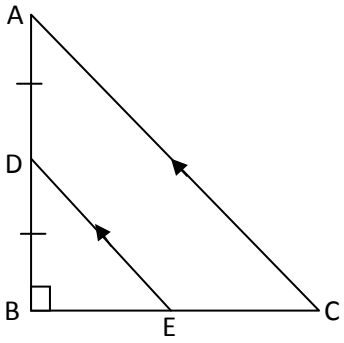
9.2. Given, rhombus ABCD with AD equal to $4y - 11$ and AB equal to $y - 8$.



9.2.1. Determine with reasons the value of y. (3)

9.2.2. If $B\hat{A}C = 35°$ determine, with reasons, the size of $\hat{B}$. (4)

9.3 Given ΔABC with AB ⊥ BC; AD = DB and DE//AC.



9.3.1 If AB = 10cm and BC = 24cm, determine, giving reasons and showing all working, the length of DE. (5)

[20]

QUESTION 10:

10.1. Complete the table for the function $f(x) = 3^x$ on DIAGRAM SHEET 2 and use that table to draw f on the axes provided on the DIAGRAM SHEET 2. (7)

10.2. Determine the equations of the following graphs:

10.2.1

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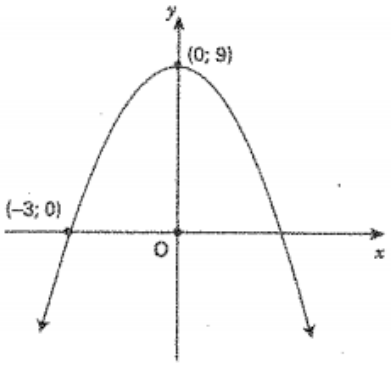
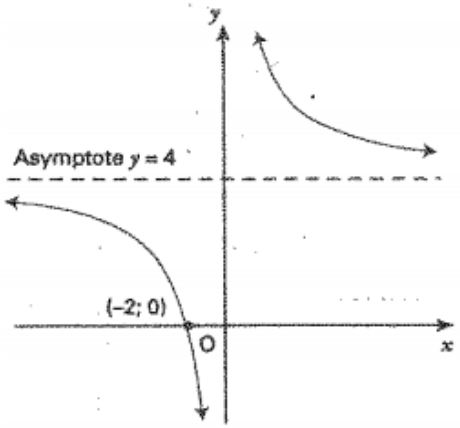


(4)

10.2.2



(4)

[15]

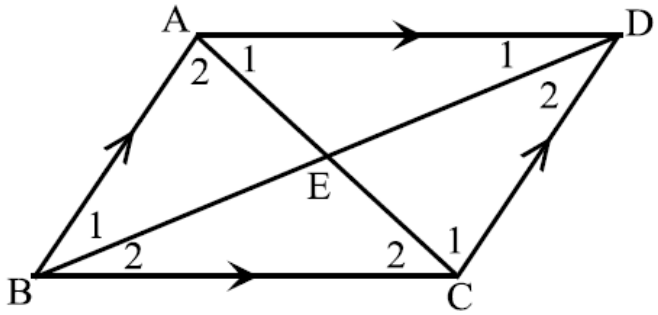
GRADE 10 MATHEMATICS

Name: _____ Teacher: _____

Question #	1	2	3	4	5	6	7	8	9	10	Total
Mark											
Out of	8	10	8	4	6	15	5	9	20	15	100
Signed											

DIAGRAM SHEET 1

9.1. THEOREM



Given: _____

R.T.P: _____

Proof: _____

_____

_____

_____

_____

_____(8)

DIAGRAM SHEET 2

10.1.1

x	-2	-1	0	1	2
$f(x)$