gr 10

HILLCREST HIGH SCHOOL

Time: 2 hours
Total: 135 marks

May 2011

INSTRUCTIONS:

1. This paper consists of 6 pages (including this page) with 11 questions. Answer ALL the questions.
2. Clearly show all calculations, diagrams, graphs etc. that you have used in determining your answer.
3. An approved calculator (non-programmable and/or non-graphical) may be used, unless other instructions are given.
4. If necessary, answers should be rounded off to two decimal places unless other instructions are given.
5. Number your answers **exactly** as the questions are numbered.
6. Diagrams are not drawn to scale.
7. Certain formulae that you may find useful are included below.
8. A sheet of squared paper has been included for Questions 8.1.1 and 8.2.1 Please write your name and your Maths teacher's name in the space provided. This sheet must be handed in with your answer booklet.
9. It is in your own interest to write legibly and to present the work neatly.

Formulae

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

QUESTION 1

1. Find the following products: (multiply out)

1.1 $(2a - 3y)(4a + 2y)$ (3)
1.2 $(3m - 4n)^2$ (3)
1.3 $(a - 7b)(a^2 + 7ab + 49b^2)$ (3)
1.4 $(a^{-1} + b)(a^{-1} - b)$ (3)
1.5 $2(m - 3) - (m - 3)^2$ (4)

[16]

QUESTION 2

2. Factorise completely:

2.1 $16a^4b^8 - 8a^3b^7$ (3)
2.2 $a^2 - 100$ (2)
2.3 $a^2 - 12a + 35$ (2)
2.4 $6ad - 4ay - 15bd + 10by$ (3)
2.5 $4a^2(b^3 - 4) - (b^3 - 4)$ (4)
2.6 $0{,}4a^2 + 0{,}7ab - 0{,}2b^2$ (4)

[18]

QUESTION 3

3. Simplify the following:

3.1 $\dfrac{2x^2 + x - 6}{2x^2 + 4x}$ (4)

3.2 $\dfrac{3a}{2y^2} + \dfrac{1}{2y^2} \div \dfrac{2x}{y}$ (4)

[8]

QUESTION 4

4. Solve the following equations:

4.1 $5a - 3 = 2a + 9$ (2)
4.2 $7(a + 3) - 3(a + 1) = 2(13 + 10a)$ (4)
4.3 $(2b - 3)(b + 2) = 0$ (2)
4.4 $x^2 - 2x - 8 = 0$ (3)
4.5 $\dfrac{2}{x} - 2 - \dfrac{1}{x} = \dfrac{1}{x} + \dfrac{1}{2}$ (4)
4.6 $x + 5 + \dfrac{6}{x} = 0$ (4)

[19]

QUESTION 5

5.1 Solve for x and illustrate your answer on a number line:

5.1.1 $3x - 2 \geq 2x - 6$ (2)

5.1.2 $2 - \frac{x}{10} < \frac{x}{5} - 1$ (4)

5.2 Make d the subject of the formula

5.2.1 $3a = 2b - ad$ (2)

5.2.2 $\frac{n}{d} + 1 = m$ (4)

[12]

QUESTION 6

6.1 Solve simultaneously for x and y:

$x + 4y = 14$
$3x + 2y = 12$ (5)

6.2 Mrs Jones buys 3 aloes and 5 gazania plants from the nursery and it costs her a total of R25.
Mrs Smith buys 4 aloes and 3 gazania plants and it costs her a total of R26.
What is the cost of each plant?
(Hint: let x = aloe and y = gazania) (6)

[11]

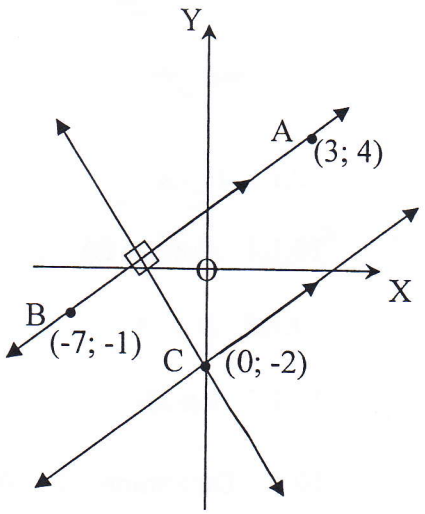
QUESTION 7

7. Find the equation of the line:

7.1 passing through A (3 ; 4) and B (-7 ; -1) (4)

7.2 passing through C (0 ; -2), parallel to AB (2)

7.3 passing through C (0 ; -2), perpendicular to AB (2)



[8]

QUESTION 8

8.1.1 Using the squared paper provided sketch on the same system of axes: $2x - y + 4 = 0$ and $f(x) = y = x^2 - 4$ (5)

8.1.2 Write down the range of f(x) (2)

8.1.3 If h(x) = f(x) + 4 determine the X intercept(s) of h(x) (2)

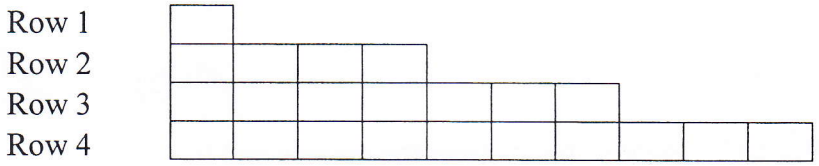
8.2.1 Using the squared paper provided sketch $g(x) = -\frac{6}{x}$ (4)

8.2.2 Write down the asymptotes of p(x) if p(x) = g(x) – 2 (2)

[15]

QUESTION 9

9 The diagram shows a design made with 4 rows of small blocks



Determine:

9.1 The number of blocks in the 6^{th} row. (1)

9.2 The number of blocks in the n^{th} row. (5)

9.3 In which row are there 505 blocks? (3)

[9]

QUESTION 10

10.1 If $\hat{A} = 48,3°$ and $\hat{B} = 22,2°$ calculate, correct to two decimal places:

10.1.1 sin(A + B) (2)

10.1.2 2cos A (2)

10.1.3 tan 2B (2)

10.2 Determine $\hat{A}$, $0° \leq \hat{A} \leq 90°$, correct to two decimal places if:

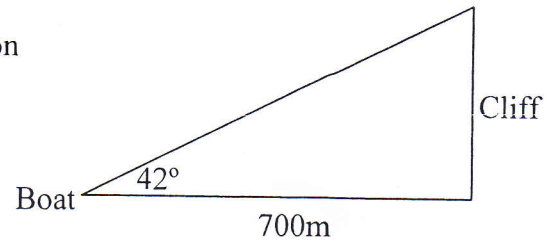
10.2.1 cos A = 0,39 (2)

10.2.2 sin 3A = 0,85 (2)

[10]

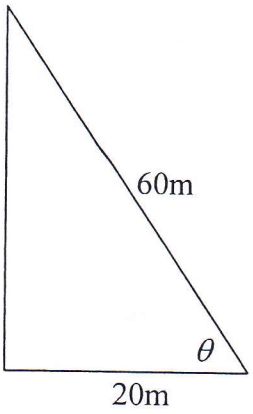
QUESTION 11

11.1 Calculate the height of a cliff if the angle of elevation from a boat to the top of the cliff is 42°.
The boat is 700m away from the foot of the vertical cliff.



(4)

11.2 The length of a rope from the top of a mast to a point 20m from foot of the mast is 60m.
Calculate the size of the angle θ that the rope makes with the ground.

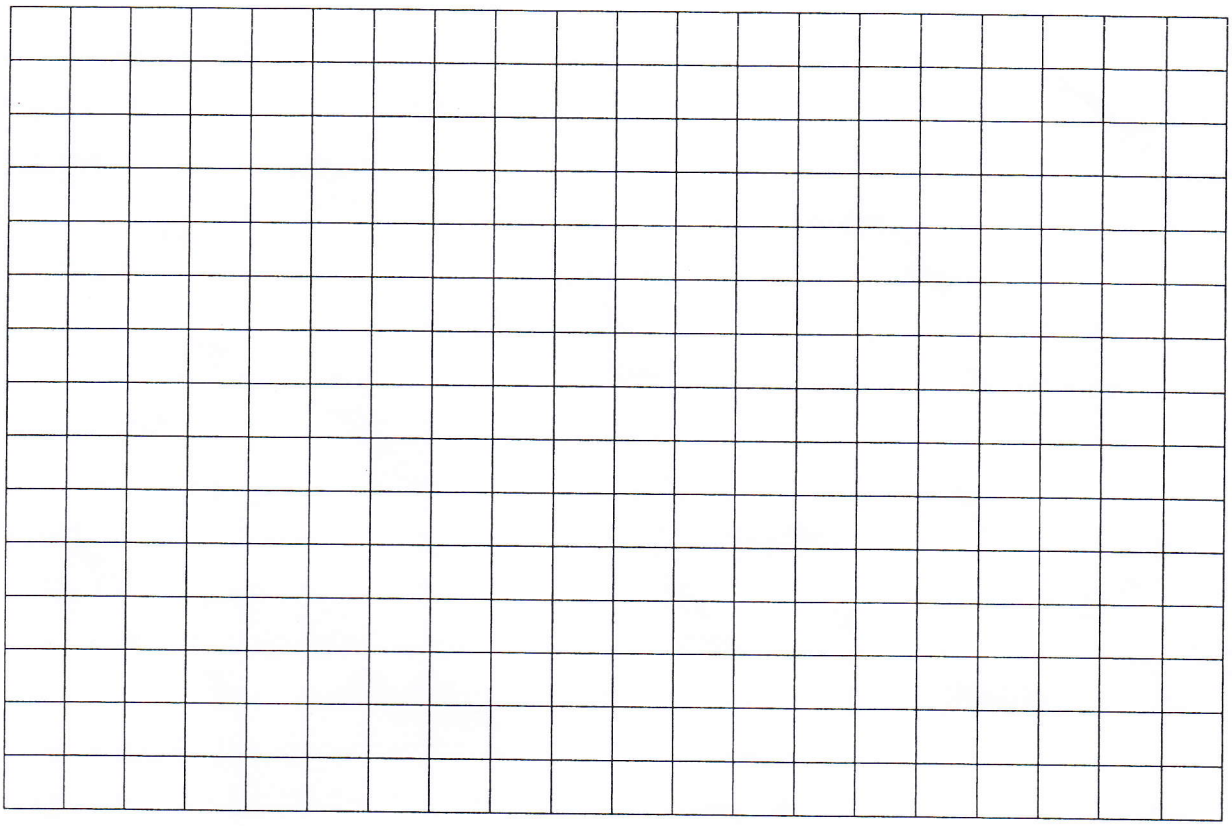


(5)

[9]

NAME: _____ TEACHER'S NAME: _____

8.1.1



8.2.1