HILLCREST HIGH SCHOOL

MATHEMATICS: GRADE 10

MAY 2012

TIME: 2 HOURS **TOTAL:** 120

INSTRUCTIONS: THIS PAPER CONSISTS OF 8 QUESTIONS.
CHECK THAT THERE ARE NO PAGES MISSING.

1. Show all working details and number the questions exactly as they are numbered on the question paper.
2. Calculators may be used unless stated otherwise. Round off to two decimal digits unless stated otherwise.
3. It is in your interest to write clearly and neatly.

QUESTION 1

Simplify:

1.1 $3(2x-4)(x-1)$ (4)

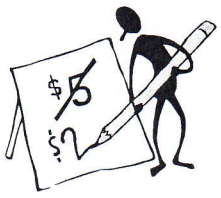
1.2 $2(x-y)^2-(x+2y)(x-2y)$ (5)

1.3 $(x-3)(2x^2-3x-4)$ (4)

[13]

QUESTION 2

Factorise completely:



2.1 $5a^2-20$ (3)

2.2 $x^2-10x-24$ (2)

2.3 $x^2-ax+bx-ab$ (4)

2.4 $4x^2-25$ (2)

2.5 $9x^2+36x-45$ (3)

2.6 $6x^2-13x+5$ (3)

2.7 $x^2(a-2)-7x(a-2)-10(2-a)$ (5)

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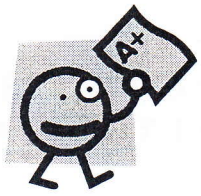
QUESTION 3



Simplify:

3.1 $\dfrac{14x+7}{7}$ (2)

3.2 $\dfrac{3x^2}{4a^2} \div \dfrac{6x}{a^3} \times \dfrac{8}{x}$ (3)

3.3 $\dfrac{2x-1}{2x} + \dfrac{3x-1}{x}$ (

[8]

QUESTION 4

Solve for x:

4.1 $2x+14=5-x$ (3)

4.2 $3(5x-2)=2(4x+11)$ (4)

4.3 $3^{-2}=\dfrac{1}{x}$ (2)

4.4 $\dfrac{5x}{3} - 2 = \dfrac{x}{4} + 15$ (4)

4.5 $\dfrac{1}{2}+\dfrac{1}{3x}=\dfrac{2-3x}{6x}$ (4)

4.6 $4x^2=49$ (4)

4.7 $x^2-x-20=0$ (3)

4.8 $(x-7)(x-5)=3$ (4)

[28]

QUESTION 5

5.1 Solve the following inequalities and graph their solutions on a number line:

5.1.1 $4x - 10 \leq 2x - 7$ **(3)**

5.1.2 $-3(2x + 3) \leq 3 - (x + 12)$ **(5)**

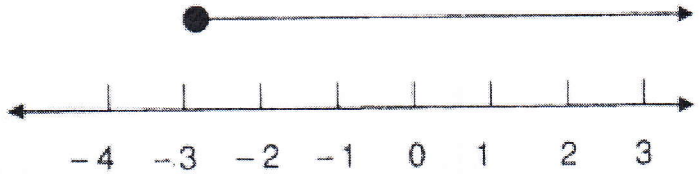
5.2 Solve the following inequality: $-5 < 1 - x \leq 10$ **(3)**

5.3

5.3.1 Represent the following on a number line:

$\{x \mid -2 \leq x < 3; x \in R\}$ **(3)**

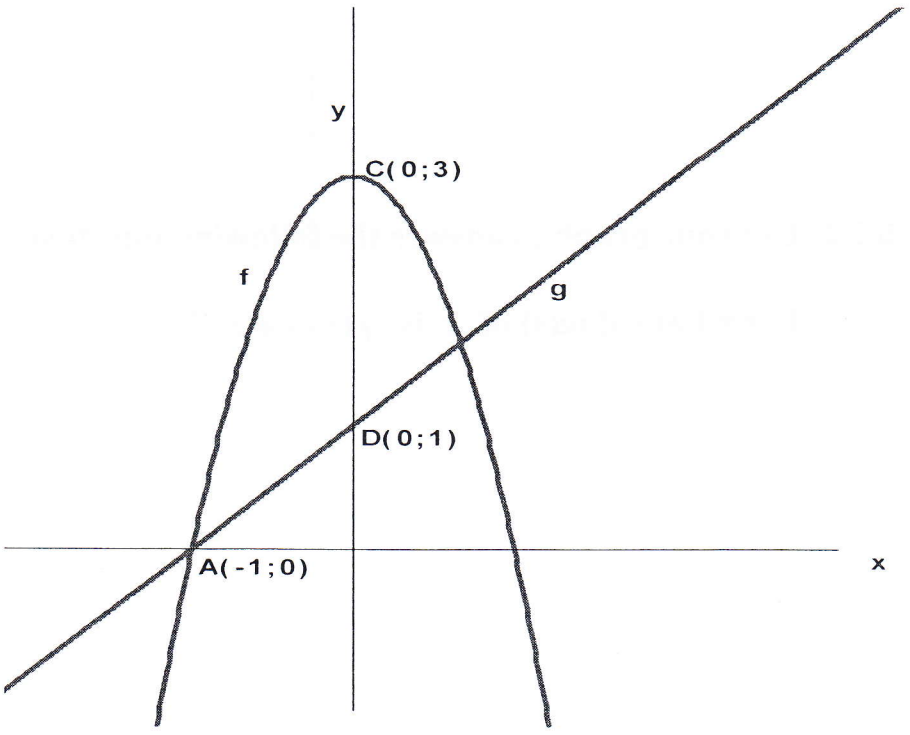
5.3.2 Write the following in interval notation: **(2)**



[16]

QUESTION 6

The diagram shows the curves of a parabola of the form $f(x) = ax^2 + q$ **and a straight line of the form** $g(x) = mx + c$



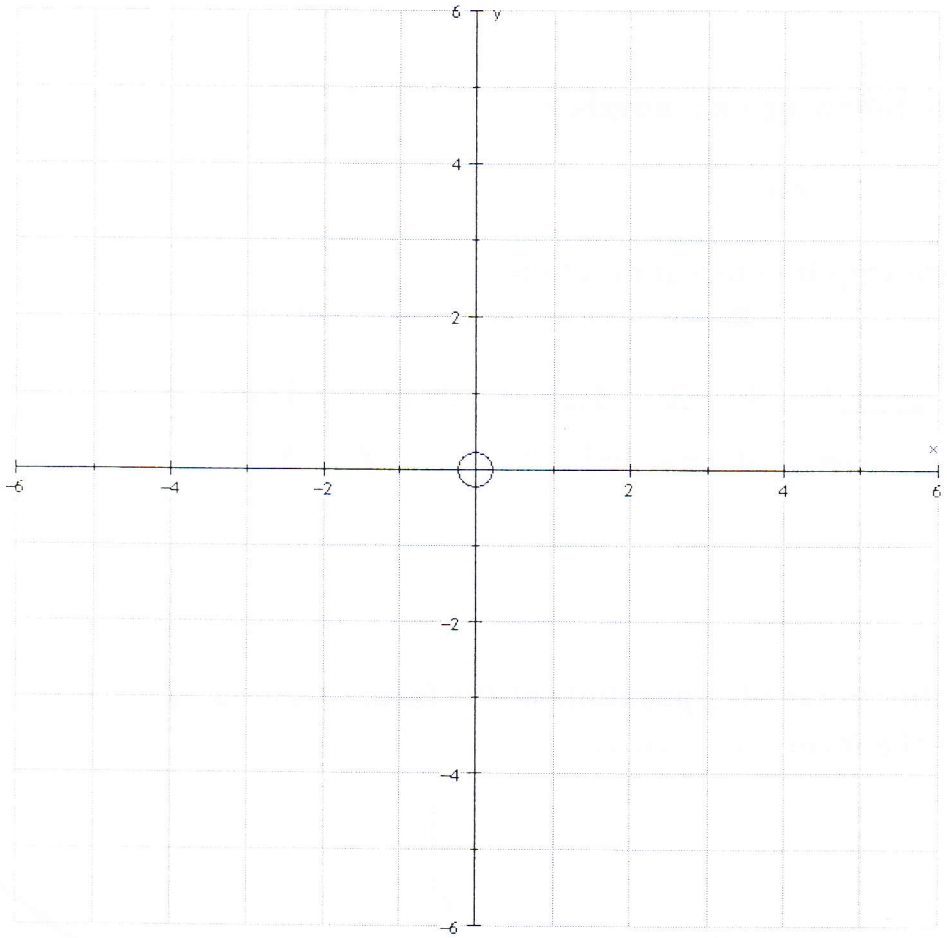
6.1.1 Find the equation of the parabola *f(x)* and the straight line *g(x)*. **(6)**

6.1.2 Determine the length of CD and AD (5)

6.1.3 Give the domain and the range for *f(x)*. (2)

6.2.1 The system of axes below has been replicated on the DIAGRAM SHEET. Draw the graphs defined by $f(x) = -x^2 + 4$ and $g(x) = \frac{4}{x}$ on the axes supplied.

(6)



6.2.2 Use your graph to answer the following question

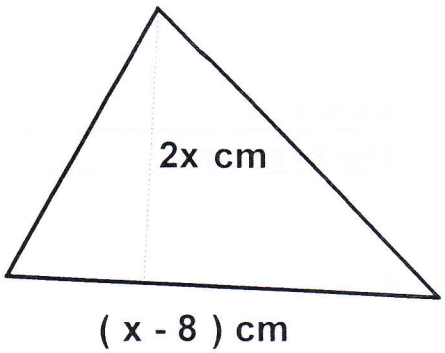
For what value(s) of x is $f(x) = g(x)$? (2)

[21]

QUESTION 7

Area of a triangle $= \dfrac{\text{base} \times \text{height}}{2}$

A triangle has a base length of $(x-8)$ cm and a height of $2x$ cm.



7.1 Determine the area of the triangle in terms of x. (2)

7.2 If the area of the triangle is 20 units^2, calculate the height and length of the base. (4)

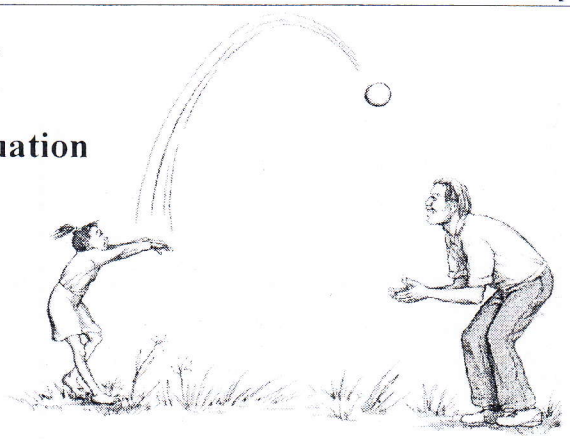
[6]

QUESTION 8

The motion of a ball in the air is defined by the equation

$$\text{height above ground} = 1 + 15t - 5t^2,$$

where t is time in seconds and height is measured in metres.



8.1 How high is the ball above the ground after $\frac{1}{2}$ a second? (2)

8.2 After how many seconds will the ball be 11m above the ground? (4)

[6]

THE END

Grade 10: Mathematics

Diagram Sheet

Name: _____

Teacher Name: _____

6.2.1