HILLCREST HIGH SCHOOL

MATHEMATICS: GRADE 10

MAY 2013

TIME: 2 HOURS **TOTAL:** 105

INSTRUCTIONS:

THIS PAPER CONSISTS OF 10 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. All relevant working must be shown.

4. It is in your interest to write clearly and neatly.

1. Simplify:

1.1 $3a(a^2-3a+2)$ (2)

1.2 $(x-3)(2x^2-3x-4)$ (4)

1.3 $\frac{4}{x}+\frac{6}{x-2}$ (4)

[10]

2. Factorise:

2.1 $9p^2-25$ (2)

2.2 $3pq-3rq+px-rx$ (3)

2.3 $6x^2-13x+5$ (3)

2.4 $x^2(a-2)-7x(a-2)-10(2-a)$ (4)

[12]

3. Simplify:

3.1 $[(a^2b^2)^a]^0$ (1)

3.2 $\left[\frac{x^2y^3}{y^3x^{-2}}\right]^3$ (3)

3.3 $9^{b-1} \times 27^{b+1}$ (4)

[8]

4. Solve for x:

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

4.2 $3^{-2}=\frac{1}{x}$ (2)

4.3 $2-\frac{x+3}{3} \geq x+1$ (illustrate your answer on a number line) (5)

4.4 $\frac{1}{2}+\frac{1}{3x}=\frac{2-3x}{6x}$ (4)

4.5 $\frac{n}{x}+1=m$ (3)

4.6 $x^2-x-20=0$ (3)

4.7 $2^{x^2+3}=16$ (4)

[24]

5. Solve simultaneously for x and y:

$$3x-2y=7$$
$$x+2y=9$$

[5]

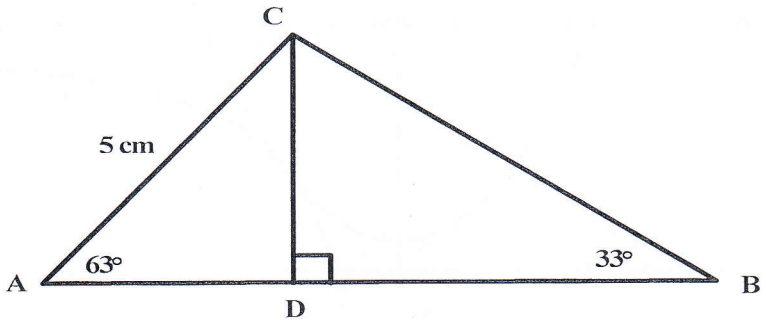
6. Solve for A: $A \in [0°;90°]$

6.1 $A = \cos 55{,}5°$ (1) 6.2 $\tan 2A = 4{,}78$ (2)

6.3 $\sin A + 4 = 5$ (2) 6.4 $3A = 4 \tan 37{,}81°$ (3)

[8]

7. In the diagram below AC = 5 centimetres, $\hat{A} = 63^0$ and $\hat{B} = 33^0$. CD ⊥ AB.



7.1 Calculate the value of CD. (3)

7.2 Calculate the length of AB. (7)

[10]

8. The seating in a section of a sports stadium is arranged so that the first row has 20 seats, the second row has 22 seats, the third row has 24 seats and so on.

8.1 Write down the number of seats in the 4^{th} row and in the 5^{th} row. (2)

8.2 Determine the general formula for this sequence. (4)

8.3 How many seats will there be in the 57^{th} row? (2)

8.4 Which row will have 168 seats? (2)

[10]

9. In each of the following, find the value of *d*:

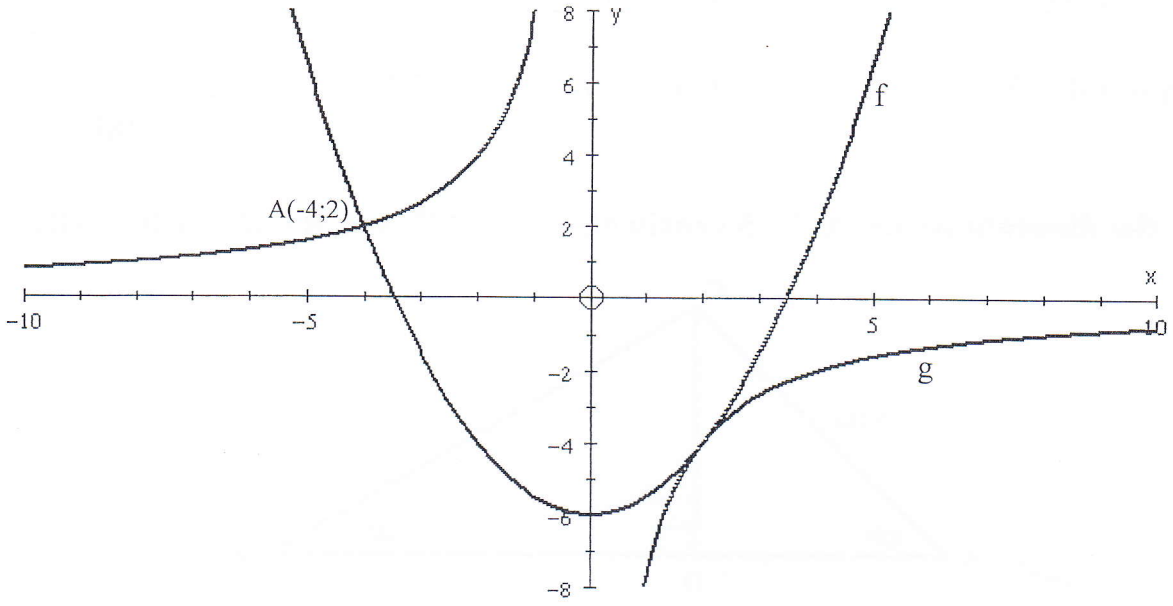
9.1 $(d\,;-7)$ lies on the line with the equation $y = 3x - 5$. (2)

9.2 $y = dx$ is parallel to $y - 2x + 3 = 0$. (2)

9.3 $y - dx = 4$ is perpendicular to $y = -3x + 10$. (3)

[7]

10.1



Referring to the figure above A(-4; 2) is a point of intersection of the parabola f and the hyperbola g:

10.1.1 Determine the equation of the parabola f. (3)

10.1.2 Determine the equation of the hyperbola g. (2)

10.1.3 If $p(x) = g(x) + 4$.
Write down the horizontal asymptote of $p(x)$. (1)

10.2 Sketch the graph of $p(x) = -3x^2 + 12$, clearly showing the intercepts on the axes. (5)

[11]