TEACHERS WITHOUT BORDERS PROGRAMME

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In Bill Gates words, at the Mandela Day 'Living Together' address: "Maintaining the quality of this country's higher education system while expanding access to more students will not be easy. But it's critical to South Africa's future" – working together, we can help achieve this."

Contributing schools to date:

Clifton School	Milnerton High	Rustenburg Girls' High	St Peter's
Durban Girls'	Northwood High	St Anne's DC	St Stithians
Fairmont High	Roedean	St John's DSG	Wynberg Boys' High
Herzlia High	Rondebosch Boys'	St Mary's DSG Kloof	Wynberg Secondary

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MATHEMATICS GR 10

NOVEMBER EXAMINATION

PAPER 1

Date: 13/11/2013

Session: 1

Marks: 100

Time: 2 Hours

Name of Candidate:_____

Name of Maths Teacher: _____

For examiner's use only

	SECTION A								SECTION B				
QUESTION	1	2	3	4	5	6	7	8	9	10	11	12	Total
Level Of Cognitive Demand	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	
ACTUAL MARK													
POSSIBLE MARK	2	5	9	12	6	4	13	6	8	5	23	7	**100**
Marker's Signature													

INSTRUCTIONS TO CANDIDATES

1. This paper consists of 7 pages.
2. This paper is answered on lined paper. Please answer on the diagram sheet in appropriate questions.
3. Show all relevant steps in calculations. Providing answers only will not earn any of the method marks. Round off to 2 decimals places where applicable.
4. Calculators may be used, unless otherwise stated.

Good Luck

SECTION A

Question 1:

Simplify: $(2x+1)(3x-4)-2x$ [2]

Question 2:

Factorise completely:

2.1 $15x^4-15y^4$ (3)

2.2 $2(x-y)^2-x+y$ (2)

[5]

Question 3:

Solve for x:

3.1 $2x^2-7x+3=0$ (3)

3.2 $bx^2-kx=0$ (3)

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

3.3 $7(3x+2)-5(2x-3)>7$ (3)

[9]

Question 4:

4.1 Use the given n^{th} term rule to calculate T_4.

$T_n=2n^2+1$ (1)

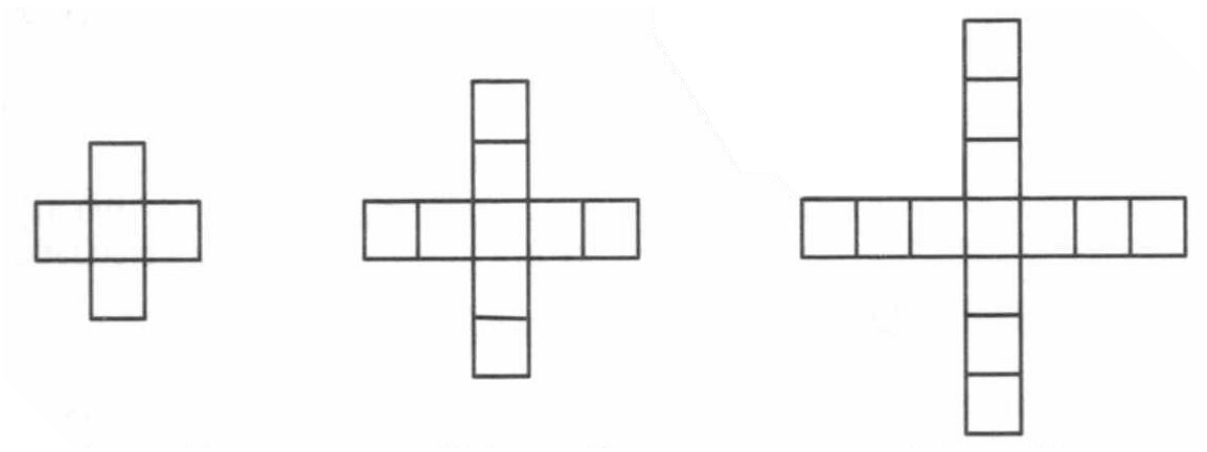
4.2 Write down the next 2 terms of this number pattern:

1; 3; 4; 7; ……. (1)

4.3 Find the general term of the following:

$\frac{1}{2}; \frac{1}{4}; \frac{1}{6}; \frac{1}{8};$…… (2)

4.4



4.4.1 How many squares will pattern 5 have? (2)

4.4.2 Make a conjecture (an opinion or theory, without showing necessary proof) about the number of squares in any pattern. (2)

4.4.3 Write down an algebraic statement to generalize the relationship between the number of squares and the pattern number. (2)

4.4.4 How many squares will pattern 15 have? (2)

[12]

Question 5:

Mr Jones buys a refrigerator for R3999;00. He pays 12% of the cost in cash and for the balance he signs a hire purchase agreement for 3 years. The interest rate is 22.1%.

Calculate:

5.1 If Mr Jones also has to pay an insurance premium of R9.60 per month, calculate his monthly installment. (5)

5.2 How much will the refrigerator have cost Mr Jones after 36 months? (1)

[6]

Question 6:

R12 000 is invested at 6.7% pa CI for 2 years. The interest rate is decreased to 6.2% pa for the next 3 years.
Calculate the value of the investment at the end of 5 years.

[4]

Question 7:

At a supermarket the first 350 shoppers one morning bought the following food:

182 bought meat, 226 bought milk and 170 bought bread. If 92 people bought meat and milk, 126 bought milk and bread, 76 bought meat and bread and 52 bought all three items.

7.1 Represent this information in the Venn diagram on the Diagram sheet. (8)

Find, with the use of your Venn diagram, the probabilities of shoppers chosen at random:

7.2 Those who bought bread but not meat or milk. (1)

7.3 Those who bought meat or milk. (1)

7.4 Those who bought bread and milk but no meat. (1)

7.5 Those who bought meat or bread but no milk. (1)

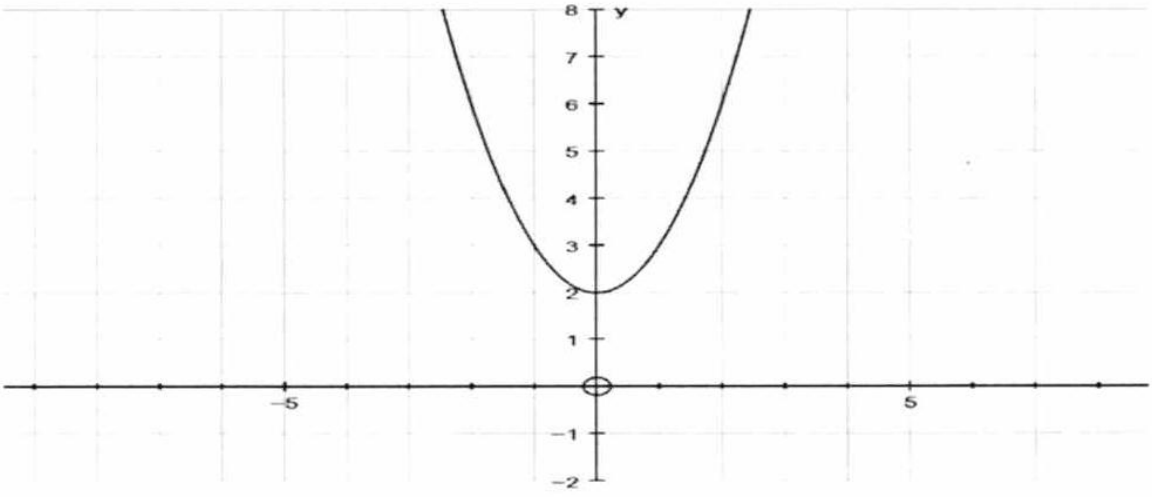
7.6 Those who bought none of these specified items. (1)

[13]

Question 8:

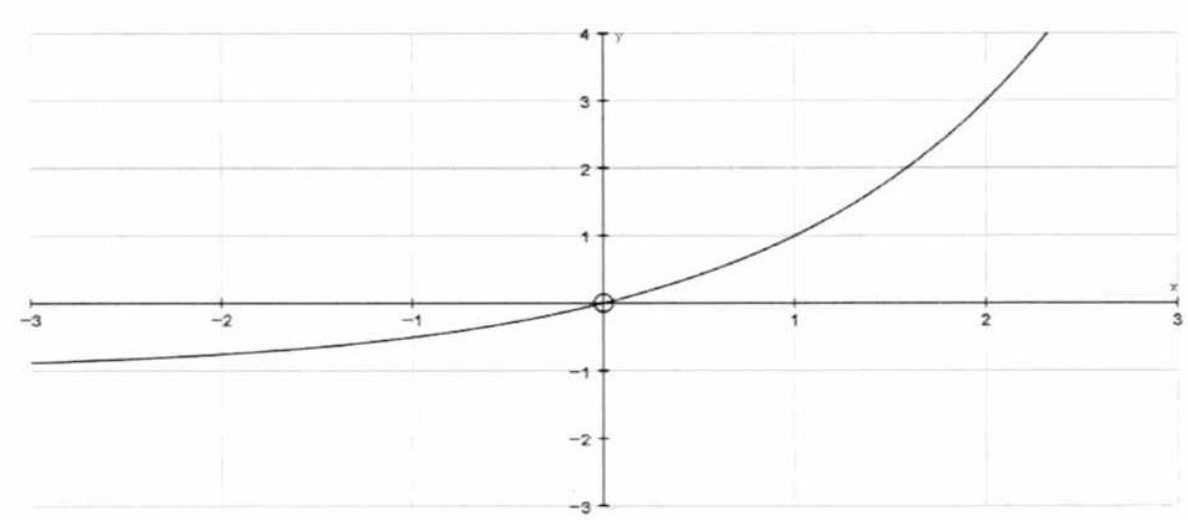
Calculate the values of q in the following graphs:

8.1 $y = x^2 + q$



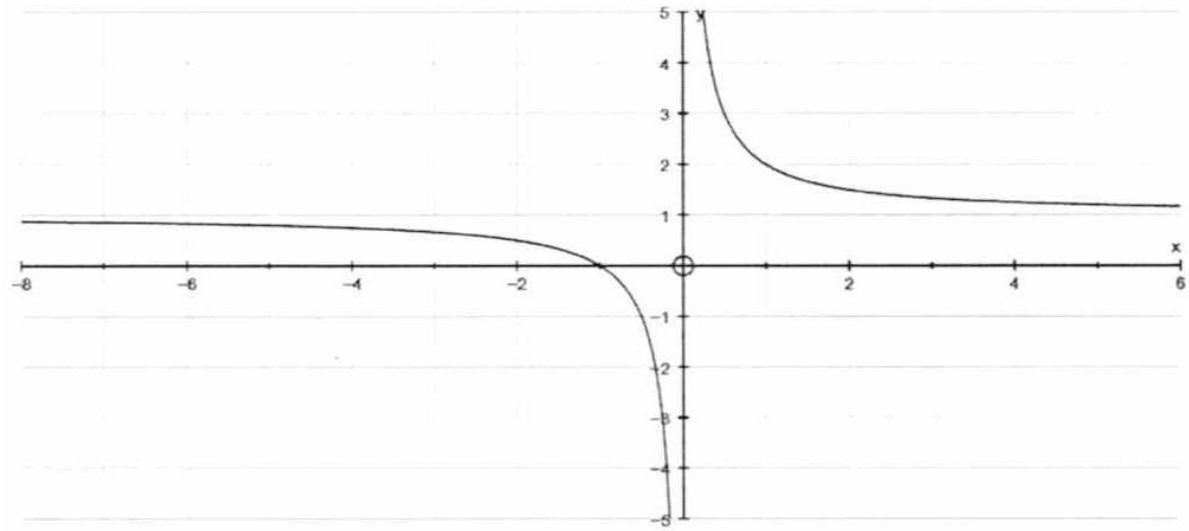
(2)

8.2 $y - q = 2^x$



(2)

8.3 $y = \frac{1}{x} + q$



(2)

[6]

SECTION B

Question 9:

Solve for x

9.1 $3.2^{x+1} - 192 = 0$ (4)

9.2 $\frac{a}{x} = \frac{b}{x} + ac - bc$ (4)

[8]

Question 10:

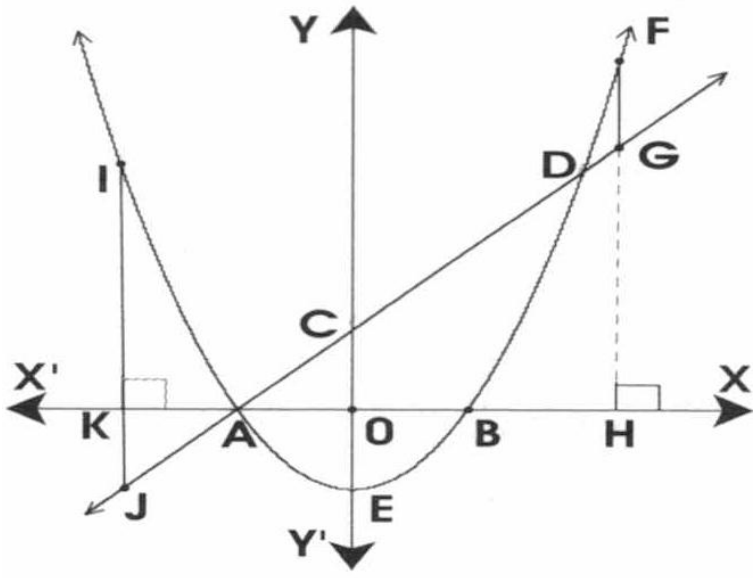
Simplify:

$$\frac{4.3^{2x} - 9.3^{2x-2}}{3^{2x} - 3^{2x-1}}$$

[5]

Question 11:

Sketched are the graphs of $f(x) = x^2 - 1$ and $g(x) = x + 1$



Determine:

11.1 The co-ordinates of A and B. (3)

11.2 The length of OC. (2)

11.3 The co-ordinates of D. (4)

11.4 The length of OE. (2)

11.5 The distance FG if OH is 4 units. (4)

11.6 The co-ordinates of I and J if IJ=4 units. (4)

11.7 The values of x for which $f(x) > 0$. (2)

11.8 The equation of a new graph $h(x)$ formed by reflecting $f(x)$ in the x axis and moving it up two units. (2)

[23]

Question 12:

You are given the following number pattern:

$$\mathbf{1^2 - 2^2 = -1 - 2}$$

$$\mathbf{2^2 - 3^2 = -2 - 3}$$

$$\mathbf{3^2 - 4^2 = -3 - 4}$$

12.1 Using the above pattern, determine the value of $199^2 - 200^2$ (2)

12.2 A conjecture (an opinion or theory) for the pattern is: "Any integer squared, less its consecutive integer squared, equals the negative of that integer less its consecutive integer."

Write this conjecture as a Mathematical equation and prove that it is correct. (5)

[7]