

NORMAN HENSILWOOD HIGH SCHOOL  
EXAMINATIONS



DATE	10 JUNE 2011
GRADE	9
SUBJECT	MATHEMATICS
TIME	2 HOURS
MARKS	100
EXAMINER	R. NIEUWENHOUDT
MODERATOR	GJ, ED, LJ, JC

*S.A.*  
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### Question 1

0	12	6	30	36	$\frac{1}{10}$
1	24	-7	0.6	$\frac{1}{0}$	0,006
2	36	8	45	0,1	$\sqrt{-9}$
3	$\sqrt{8}$	9	$\frac{13}{5}$	$0,3 \times 10^4$	$\frac{2}{5}$
4	-3	-10	75	0,06	2,223
5	$0,\dot{3}$	11	0,4	-80	-100

Here is a tank full of numbers. Choose numbers from the tank to answer these questions:

- 1.1 Write down the prime numbers less than ten. (2)
- 1.2 How many of the natural numbers are factors of 36? (1)
- 1.3 Write down the numbers which are multiples of 3 (2)
- 1.4 Which two numbers are equal? (1)
- 1.5 Write the number in scientific notation as an ordinary number. (2)
- 1.6 Which number can be written as  $\frac{3}{5}$ ? (1)
- 1.7 (a) What type of decimal is  $0,\dot{3}$ ? (1)  
(b) Write it as a common fraction. (1)
- 1.8 Which number is irrational? (1)
- 1.9 Which number is imaginary? (1)
- 1.10 How do you know that the numbers 30, 45 and 75 are all  
(a) Divisible by 3? (2)  
(b) Divisible by 5? (2)
- 1.11 If you got  $\frac{45}{75}$  for a test, what would be your percentage? (2)
- 1.12 Write the ratio 30 : 75 in its simplest form. (2)

1.13 Write 0,006 in scientific notation. (2)

1.14 Write  $\frac{13}{5}$  as a ~~common~~ <sup>decimal</sup> fraction correct to two decimal places. (2)

1.15 Divide 0,6 by 0,006 (2)

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### Question 2

2.1 Simplify:

(a)  $2(-3x^2y)^2$  (2)

(b)  $(x - 2)^2 + (x + 2)(x - 2)$  (4)

(c)  $-\frac{3}{4}x(4x - \frac{2}{3}y)$  (2)

2.2 (a) Find the product of  $(x + 2)$  and  $(2x + 1)$  (2)

(c) Now subtract your answer from  $3x^2 + 6x + 1$  (2)

2.3 Factorize:

(a)  $2xy - 4y^2 + 12x^2y$  (2)

(b)  $3x - 27xy^2$  (3)

(c)  $x^2 - \frac{4}{9}$  (2)

(d)  $a(x - y) + b(x - y)$  (2)

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### Question 3

3.1 Solve the equations

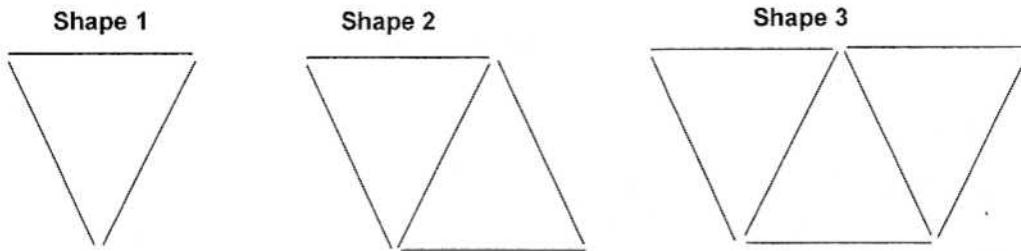
(a)  $2(x + 1) - 4 = 2(1 - x)$  (4)

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

3.2 A hare, a tortoise, and a snail all complete a cross-country run. The hare is four times as fast as the tortoise who is three times as fast as the snail. If the hare runs at a speed of three metres per second, and the snail takes  $6\frac{2}{3}$  hours to complete the course, how long was the course? (5)

### Question 4

4.1 The following shapes were made with matches, and the table below was drawn up to show the data:



No. of triangles ( <i>t</i> )	1	2	3	6	(b)	<i>n</i>
No. of matches ( <i>m</i> )	3	5	7	(a)	51	

- (a) Draw the next shape in the pattern. (2)
- (b) On your answer sheet, write down the values for **a** and **b**. (4)
- (c) On your answer sheet write a formula for the number of matches in *n* triangles (3)

4.2. Study this table:

<i>x</i>	-2	-1	0	2	4
<i>y</i>	8	5	2	<i>p</i>	<i>q</i>

- 4.2.1 On your answer sheet, write down values for *p* and *q*. (2)
- 4.2.2 What is the formula that describes the pattern shown in this table? (3)

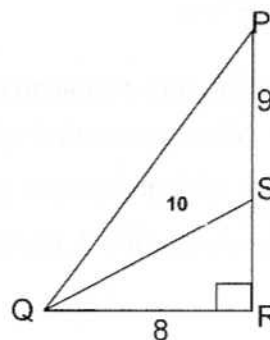
[14]

### Question 5

5.1 State the Theorem of Pythagoras. (2)

5.2 Use the <sup>k</sup> Theorem to find the length of SR. (3)

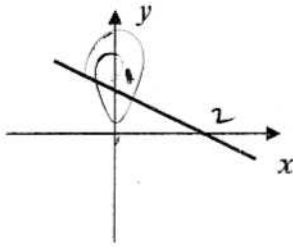
5.3 Now calculate the length of PQ (4)



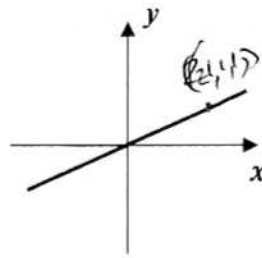
### Question 6

Study these sketch graphs, and then answer the questions:

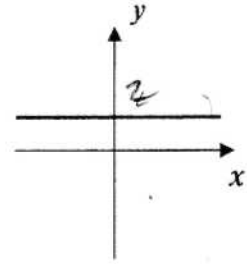
Graph A



Graph B



Graph C



#### For Graph A

- 6.1 Write down the co-ordinates of the y-intercept. (2)
- 6.2 Calculate the gradient of this graph. (3)
- 6.3 Hence, write down the equation of this graph (1)

#### For Graph B

- 6.4 Determine the equation of this graph. (3)
- 6.5 Hence, write down the gradient of a line **perpendicular** to this graph (2)

#### For Graph C

- 6.6 What is the gradient of this graph? Give a reason for your answer. (2)

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### Question 7

Draw sketch graphs of the following functions on your answer sheet. Remember to show all calculations. Draw large, clear diagrams and mark all intercepts with the axes.

- 7.1  $y = 3x - 6$  (4)
- 7.2  $2y - 4x = -6$  (4)
- 7.3  $y = -2$  (2)

[10]