



SYDNEY BOYS HIGH SCHOOL
MOORE PARK, SURRY HILLS

2009

Year 7

Yearly Examination

Mathematics

General Instructions

- Working time – 90 minutes
- Write using black or blue pen
- Calculators may **NOT** be used
- All *necessary* working should be shown in every question if full marks are to be awarded.
- Marks may **NOT** be awarded for messy or badly arranged work.
- If more space is required, clearly write the number of the QUESTION on one of the back pages and answer it there. Indicate that you have done so.
- Clearly indicate your class by placing an **X**, next to your class.
- Give your answers in simplest exact form unless otherwise stated.

NAME:

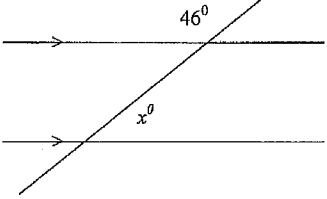
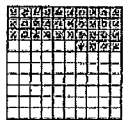
Examiner: *T.Evans*

Class	Teacher	
7E	Mr. Gainford	
7F	Ms. Nesbitt	
7M	Mr. Choy	
7R	Ms. Roessler	
7S	Ms. Ward	
7T	Mr. Choy	

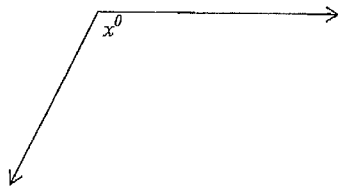
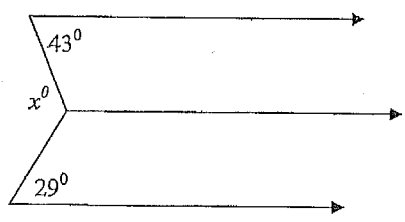
Question	Mark	
1		/20
2		/20
3		/20
4		/20
5		/20
6		/20
Total		/120

	Question ONE (20 Marks)	Marks
a.	Write $\frac{124}{16}$ as a mixed fraction in simplest form.	1
b.	Simplify $4b + 2c - 5b$	1
c.	Convert 0.472 to a fraction in simplest form	1
d.	Simplify $36 - (8 - 6) \times 5$	1
e.	Draw the net of a triangular prism	1
f.	$s \times s \times t \times t \times s \times t =$ a) $3st$ b) $3s \times 3t$ c) st^3 d) $(st)^3$	1
g.	Write 3.4679 correct to two decimal places	1
h.	Find $\frac{2}{5}$ of 60kg	1
i.	Expand $3x(4 - x)$	1
j.	Express 42 as the sum of two prime numbers	1

k.	$-7 - (-4) =$		1
l.	Calculate $\frac{6-2}{\sqrt{25 \times 4 + 2 + 5}}$		1
m.	The sum of two fractions is $8\frac{15}{24}$. If one fraction is $6\frac{1}{8}$, what is the other?		1
n.	Write 2010 in Roman numerals		1
o.	If $V = lbh$ find l when $V = 300$, $b = 5$, $h = 20$		1
p.	Convert 372 minutes into hours and minutes		1
q.	London is 11 hours behind Sydney. QANTAS Flight 1 leaves Sydney on November 2 at 0630. It takes 21 hours to arrive in London. QANTAS Flight 1 will arrive in London on: (use London time and date) a) 0330 Nov 3 b) 1630 Nov 2 c) 1630 Nov 4 d) Midday Nov 3		1
r.	When the numbers 5.02, 5.18, 5.2, 5.007 and 5.018 are arranged from least to greatest, what number is in the middle?		1
s.	If Scott turned 18 on 11 th October 2008, in what year was he born?		1
t.	Caitlyn has made a pattern of numbers where she adds 7. The pattern is 6, 13, 20, 27, Will 93 be in the pattern?		1

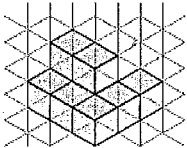
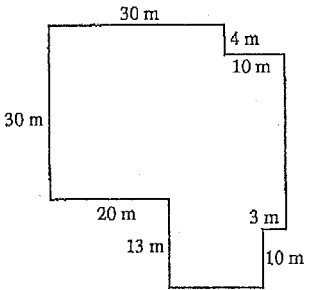
Question TWO (20 Marks)		Marks	
a.	Write an algebraic expression for the following statement: 7 less than the difference of x and y	1	
b.	Find x in the following diagram: 	<p>x equals:</p> <p>Reason:</p>	2
c.	A family of four people uses on average about 800 litres of water each day. Approximately how much would this family use in one month?	1	
d.	What percentage is represented by the shaded diagram: 	1	
e.	Construct a circle with diameter 6cm	1	

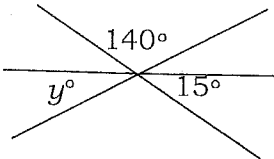
f.	If $\frac{8}{13}$ of a number is 24, what is the number?	1
g.	Five times a number is subtracted from 37 and the answer is 87. Write a mathematical expression for this statement. (note: you do not need to solve the equation)	1
h.	The sum of three consecutive numbers is 51. Find the numbers.	2
i.	Which of the following lengths is less than half a metre? a) 0.2km b) 0.62m c) 72cm d) 302mm	1
j.	Simplify $32t^3u^4 + 8tu^3$	2
k.	How many lines of symmetry does a regular hexagon have?	1
l.	How many months have exactly 30 days?	2
m.	i) The length of a rectangular playing field is three times its width. Find the dimensions of the field if the perimeter is 336 metres. ii) How many laps of the field must you complete to run at least three kilometres?	2 2

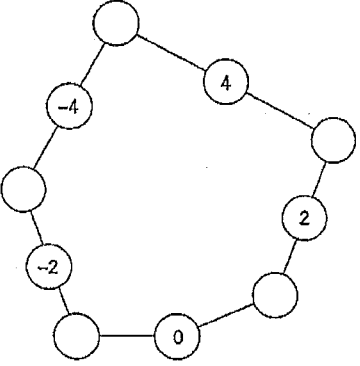
Question THREE (20 Marks)		Marks
a.	Measure the following angle and then state the type of angle it is. 	Measurement: 1 Angle Type: 1
b.	How many pairs of parallel faces on a cube?	1
c.	What fraction is \$1.20 of \$3.40?	1
d.	Nick is always running late for school. If his mother sets his clock so that it is 25 minutes fast, what is the actual time if Nick's clock shows 7:15am?	1
e.	Find the value of the pronumeral giving reasons: 	2

f.	Expand and simplify: i) $3a^2 - (a^2 + 1)$ ii) $4(a + y) - 2(a - y)$	2 2
g.	Find the next number of the sequences i) $-1, 2, 7, 14, 23, \dots$ ii) $3, 4, 6, 8, 10, \dots$	2 2
h.	For the numbers 6, 12, 42 find: i) The LCM ii) The HCF	2
i.	Which of the numbers $-20, -\frac{3}{4}, 0, \frac{1}{2}, 10$ is greater than its square?	2
j.	What is the time difference between 8:45am and 2:30pm?	1

Question FOUR (20 Marks)		Marks										
a.	<p>If m is the number of matchsticks and p is the pattern number.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>p</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>m</td> <td>14</td> <td>17</td> <td>20</td> <td>23</td> </tr> </tbody> </table> <p>i) Find the algebraic rule which links p and m</p> <p>ii) How many matches are required to make the 70th pattern?</p>	p	1	2	3	4	m	14	17	20	23	3
p	1	2	3	4								
m	14	17	20	23								
b.	Write 216 as a product of prime numbers using index notation. (Hint: draw a factor tree)	2										
c.	Josh purchased 4 items from a store. He can remember that three of the items cost \$11.27, \$8.42 and \$7.91. He knows that he got \$16.25 change from a \$50 note. How much did the fourth item cost?	2										
d.	My age is a two digit number. It is divisible by 2, 3, 6 and 9. I am older than 20 but younger than 50 years old. How old am I?	2										

e.	A ball bounces $\frac{2}{3}$ of the distance through which it falls. If the second rebound is 72cm, find the height which it was originally dropped.	2
f.	Draw the front and right side views of the solid below. 	2
g.	Find the value of $3 + \frac{3}{3 + \frac{3}{3+3}}$	2
h.	What is the maximum number of points of intersection of four distinct straight lines?	3
i.	Find the perimeter of the following figure: 	2

Question FIVE (20 marks)		
a.	Excluding 1 and 105, how many other factors does 105 have?	2
b.	In 2007, the price of one kilogram of Charlies Chocolate was \$35.00. In 2008 the price was increased by 10%. In 2009, the 2008 price was increased by 10%. How much does a kilogram of Charlies Chocolate cost now?	2
c.	Find the value of y  (you do not need to give reasons)	2
d.	Of 33 students in a class, 18 belong to the mathematics club, 17 belong to the science club and 4 belong to neither. How many students belong to both clubs?	1
e.	A baseball team has won 50% of the 60 games it has played. Find the number of games the team must win in succession to increase its winning percentage to 60%	3
f.	List the composite numbers between 90 and 100 inclusive.	3

g.	A calendar watch loses one second per day. At this rate, what is the approximate length of time, in years, for the watch to lose exactly 24 hours?		3								
h.	<p>Arrange the numbers 1, -1, 3, -3, -5 on the pentagon so that the three numbers on each side add up to -2.</p> 		2								
i.	<p>Complete the table below, using the rule $y = 3x - 2$</p> <table border="1" data-bbox="367 962 707 1018"> <tr> <td>x</td> <td>7</td> <td>2</td> <td>-1</td> </tr> <tr> <td>y</td> <td></td> <td></td> <td></td> </tr> </table>	x	7	2	-1	y					2
x	7	2	-1								
y											

	Question SIX (20 Marks)	Marks
a.	<p>Richie's rich uncle gave him \$5 for his first birthday. On each birthday after that, he doubled his previous gift. What was the total amount of money he had given Richie up to and including his eighth birthday?</p>	4
b.	<p>On Old MacDonald's farm every two horses share one trough, every three cows share one trough and every eight pigs share one trough. Old MacDonald has the same number of each animal, and he has a total of 69 troughs. How many animals does Old MacDonald have on his farm?</p>	4
c.	<p>Find the number of integers between 100 and 1000 such that the sum of their digits is 10.</p>	4

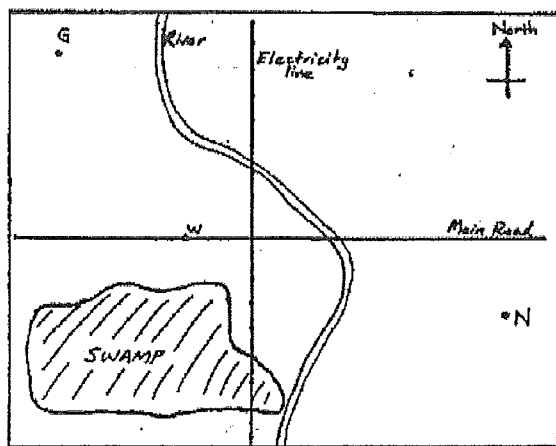
d. I wish to build my house in the countryside shown on the map below. The map shows my Grandmother's house (G), my Nana's house (N), a water source (W) 2km west of where the electricity line crosses the main road, a river and swamp.

4

For various reasons I wish to locate the house so that

- it is equidistant from Nana's house and Grandma's house,
- it is at least 1km from the main road,
- it is no more than 2km from the electricity line,
- it is within 2.5km of the water source,
- it is not in the river or swamp.

On the map, clearly mark the places where I could build my house.



Scale 1cm = 1km

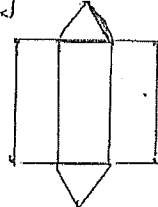
e. A dog and a rabbit are 160 metres apart. The dog chases the rabbit. For every 9 metres that the dog runs, the rabbit jumps 7 metres. Find the distance, in metres, that the dog must run in order to overtake the rabbit.

4

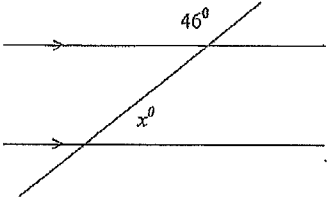
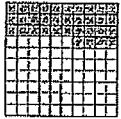
Use this space if you wish to **REWRITE** any answers

Clearly *indicate* the **QUESTION** number.

Question	

	Question ONE (20 Marks)		Marks
a.	Write $\frac{124}{16}$ as a mixed fraction in simplest form.	$7\frac{3}{4}$	1
b.	Simplify $4b+2c-5b$	$-b+2c$	1
c.	Convert 0.472 to a fraction in simplest form	$\frac{59}{125}$	1
d.	Simplify $36-(8-6)\times 5$	$36-10=26$	1
e.	Draw the net of a triangular prism	e.g. 	1
f.	$s \times s \times t \times t \times s \times t =$ a) $3st$ b) $3s \times 3t$ c) st^3 d) $(st)^3$	(d)	1
g.	Write 3.4679 correct to two decimal places	3.47	1
h.	Find $\frac{2}{5}$ of 60kg	24 kg	1
i.	Expand $3x(4-x)$	$12x-3x^2$	1
j.	Express 42 as the sum of two prime numbers	13 29 11 31 etc	1

k.	$-7 - (-4) =$	-3	1
l.	Calculate $\frac{6-2}{\sqrt{25 \times 4} \div 2 + 5}$	$\frac{4}{10} = \frac{2}{5}$	1
m.	The sum of two fractions is $8\frac{15}{24}$. If one fraction is $6\frac{1}{8}$, what is the other?	$\frac{5}{2} = 2\frac{1}{2}$	1
n.	Write 2010 in Roman numerals	MMX	1
o.	If $V = lbh$ find l when $V = 300$, $b = 5$, $h = 20$	$l = \frac{V}{bh} = \frac{300}{5 \times 20} = 3$	1
p.	Convert 372 minutes into hours and minutes	6h 12m	1
q.	London is 11 hours behind Sydney. QANTAS Flight 1 leaves Sydney on November 2 at 0630. It takes 21 hours to arrive in London. QANTAS Flight 1 will arrive in London on: (use London time and date) a) 0330 Nov 3 b) 1630 Nov 2 c) 1630 Nov 4 d) Midday Nov 3	(b)	1
r.	When the numbers 5.02, 5.18, 5.2, 5.007 and 5.018 are arranged from least to greatest, what number is in the middle?	5.02	1
s.	If Scott turned 18 on 11 th October 2008, in what year was he born?	1990	1
t.	Caitlyn has made a pattern of numbers where she adds 7. The pattern is 6, 13, 20, 27, Will 93 be in the pattern?	NO	1

Question TWO (20 Marks)		Marks
a.	Write an algebraic expression for the following statement: 7 less than the difference of x and y	$x - y - 7$ 1
b.	Find x in the following diagram: 	x equals: $180 - 46 = 134^\circ$ Reason: vertically opposite and Co-interior (and other solutions) 2
c.	A family of four people uses on average about 800 litres of water each day. Approximately how much would this family use in one month?	24 000 L 1
d.	What percentage is represented by the shaded diagram: 	34% 1
e.	Construct a circle with diameter 6cm	1

f.	If $\frac{8}{13}$ of a number is 24, what is the number?	39 1
g.	Five times a number is subtracted from 37 and the answer is 87. Write a mathematical expression for this statement. (note: you do not need to solve the equation)	$37 - 5x = 87$ 1
h.	The sum of three consecutive numbers is 51. Find the numbers.	16, 17, 18 2
i.	Which of the following lengths is less than half a metre? a) 0.2km b) 0.62m c) 72cm d) 302mm	(d) 1
j.	Simplify $32t^3u^4 + 8tu^3$	$4t^2u$ 2
k.	How many lines of symmetry does a regular hexagon have?	6 1
l.	How many months have exactly 30 days?	4 2
m.	i) The length of a rectangular playing field is three times its width. Find the dimensions of the field if the perimeter is 336 metres. ii) How many laps of the field must you complete to run at least three kilometres?	$(x + 3x) \times 2 = 336$ $8x = 336$ $x = 42$ $l = 126 \text{ } w = 42$ 9 2

Question Six

(a) 1275

(b) ~~210~~ 216

(c) 100



(e) 720°

Question 3

(a) 115

obtuse

(b) 3

(c) $\frac{6}{17}$

(d) 6:50 am

(e) 72 (altent)

(f) (i) $2a^2 - 1$

(ii) $2a + 6y$

(g) (i) 34

(ii) anything

(h) (i) 84

(ii) 6

(i) $\frac{1}{2}$ 22

(j) 5 hrs 45 min

$\frac{225}{V_1}$

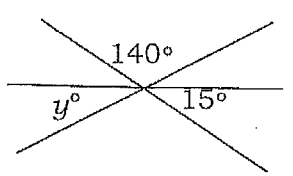

159.

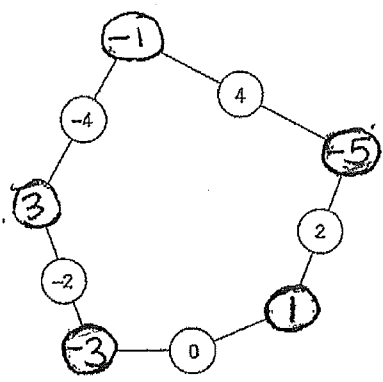
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Question FOUR (20 Marks)		Marks											
a.	<p>If m is the number of matchsticks and p is the pattern number.</p> <table border="1"> <tr> <td>p</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>m</td> <td>14</td> <td>17</td> <td>20</td> <td>23</td> </tr> </table> <p>i) Find the algebraic rule which links p and m</p> <p>ii) How many matches are required to make the 70th pattern?</p>	p	1	2	3	4	m	14	17	20	23	<p>$m = 3p + 11$</p> <p>$m = 3 \times 70 + 11$ $= 221$</p>	3
p	1	2	3	4									
m	14	17	20	23									
b.	<p>Write 216 as a product of prime numbers using index notation. (Hint: draw a factor tree)</p>	$2^3 \times 3^3$	2										
c.	<p>Josh purchased 4 items from a store. He can remember that three of the items cost \$11.27, \$8.42 and \$7.91. He knows that he got \$16.25 change from a \$50 note. How much did the fourth item cost?</p>	<p>$\\$33.75 - 3 \text{ items}$ $= \\$27.60$ $= \\$6.15$</p>	2										
d.	<p>My age is a two digit number. It is divisible by 2, 3, 6 and 9. I am older than 20 but younger than 50 years old.</p> <p>How old am I?</p>	36	2										

e.	<p>A ball bounces $\frac{2}{3}$ of the distance through which it falls. If the second rebound is 72cm, find the height from which it was originally dropped.</p>	<p>$\frac{2}{3} \times \frac{2}{3} \text{ of height} = 72 \text{ cm}$ $\frac{4}{9} \cdot h = 72 \text{ cm}$ $H = 18 \times 9$ $= 162 \text{ cm}$</p>	2
f.	<p>Draw the front and right side views of the solid below.</p> <p>Front</p> <p>R'S</p>	2	
g.	<p>Find the value of $3 + \frac{3}{3 + \frac{3}{3 + 3}}$</p>	$3 \frac{6}{7}$	2
h.	<p>What is the maximum number of points of intersection of four distinct straight lines?</p>	6	3
i.	<p>Find the perimeter of the following figure:</p>	<p>$30 + 4 + 10 + 3 + 10$ $+ 13 + 20 + 30 + 29$ $+ 17 = 166 \text{ m}$</p> <p>$x = 29$ $y = 17$ or $(40 \times 2 + 43 \times 2)$</p>	2

Angie pls check (P3)

Question FIVE (20 marks)		
a.	Excluding 1 and 105, how many other factors does 105 have?	$3, 5, 7, 15, 21, 35$ <div style="border: 1px solid black; padding: 5px; display: inline-block;">6</div>
b.	In 2007, the price of one kilogram of Charlies Chocolate was \$35.00. In 2008 the price was increased by 10%. In 2009, the 2008 price was increased by 10%. How much does a kilogram of Charlies Chocolate cost now?	$2007 \quad 1\text{kg} = 35$ $2008 \quad 1\text{kg} = 38.5$ $2009 \quad 1\text{kg} = 42.35$ <div style="border: 1px solid black; padding: 5px; display: inline-block;">\$42.35</div>
c.	Find the value of y  (you do not need to give reasons)	25°
d.	Of 33 students in a class, 18 belong to the mathematics club, 17 belong to the science club and 4 belong to neither. How many students belong to both clubs?	 <div style="border: 1px solid black; padding: 5px; display: inline-block;">6</div>
e.	A baseball team has won 50% of the 60 games it has played. Find the number of games the team must win in succession to increase its winning percentage to 60%	$\frac{30}{60} = 0.5$ $\frac{45}{75} = 0.6$ Increase = <div style="border: 1px solid black; padding: 5px; display: inline-block;">15 games</div>
f.	List the composite numbers between 90 and 100 inclusive.	$90, 92, 93, 94, 95, 96, 98, 99, 100$

g.	A calendar watch loses one second per day. At this rate, what is the approximate length of time, in years, for the watch to lose exactly 24 hours?	$(24 \times 60 \times 60) \div 365 = 25$ <div style="border: 1px solid black; padding: 5px; display: inline-block;">237 yrs</div>								
h.	Arrange the numbers 1, -1, 3, -3, -5 on the pentagon so that the three numbers on each side add up to -2.									
i.	Complete the table below, using the rule $y = 3x - 2$	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x</td> <td>7</td> <td>2</td> <td>-1</td> </tr> <tr> <td>y</td> <td>19</td> <td>4</td> <td>-5</td> </tr> </table>	x	7	2	-1	y	19	4	-5
x	7	2	-1							
y	19	4	-5							