## **NEWINGTON COLLEGE**



## Mid Year Examination 2012 YEAR 8 MATHEMATICS

Time allowed: 90 minutes

NAME:		Teacher:	<u> </u>
Outcomes being assessed:	1. Factorises simpl	le algebraic expressions and us	es this to simplify
	simple algebraic	c fractions.	• •
	2. Operates with po	ercentages.	
	<ol><li>Uses algebraic t</li></ol>	techniques to solve linear equat	tions and simple
	inequalities,		
	4. Uses and applies	s Pythagoras' Theorem.	
	5. Constructs, read	ls and interprets graphs, tables,	chart and statistica
	information.		
Directions to candidates			

All questions may be attempted.

In each question, show all necessary working.

The use of hand-held non-programmable calculators is permitted.

Marks will be deducted for careless or badly arranged work.

Outcome Mar

Algebra //2

Outcome	Mark
Algebra	/20
Percentages	/2.0
Equations	/30
Pythagoras' Theorem	/20
Data	/10
Total	. /100

Teacher's Comment:

Student's Comment:

SECTIO		20 Aark
	) 6x+x	
	$3a^2+4a^2$	
(	6y - 8b + 2y	
(	) 3a×2b	
(6	) -6k×5k	
(f	$m^6  imes m^3$ .	
<b>(</b> £	) $8c^4 \times 5c^3$	
(l:	$\left(2f^3\right)^4$	
(i	6y <sup>6</sup> ÷ 2y <sup>3</sup>	
G)	$\frac{12\bar{x}^6y^2}{4x^2y}$	

			ur o ima rear exami	nusion, 201
2. Factorise fully				
	4) - 1.0 a - 1.1 (1.1) - 1.1 (1.1) 1. 1. 1. 2 (1.1) - 1.1 (1.1) (1.1)			2
(a) $4p-12$				
			Jan Kan II	1
(b) $6x^8 - 9x^4 + 12x^2y$				
			<del>-</del>	-
3. Simplify $\frac{4x+8}{6x+12}$				2
0x + 12				
				·
4. Expand and simplify $7y - 4$	(2y-1)			2
				2
5. Simplify $\frac{5a}{4} - \frac{a}{3} =$	Alia Batali ki shi b			4
4 : 3				
6. Simplify completely $\frac{8x-12}{x}$	$\frac{x-3}{x}$			2
	$7x^4$			
		alian da sabila. Tinung		
	ra raje e projekto je je je. Popije in projekto i president			united (
		era <u>i i re</u> nta programa de la composición del composición de la composición del composición de la com		

SECTION 2 PERCENTAGES	20 Marks
1. Convert $\frac{5}{8}$ to a percentage.	2
2. Find 12% of \$300.	1
3. Convert 9% to a decimal.	
4. Convert to a fraction in simplest form:	
(a) $36\%$ (b) $12\frac{1}{2}\%$	1
5. Increase 650 by 30%.	2
6. Tom scored 65% in his Maths test. If the paper was out 80, what was his mark out of 80.	2

7. Express 15 hours out of 3 days as a percentage. (Give your answer correct to 1 decimal place)	2
[이 기존에 되기 및 발생물값이 돌아가는 동안되고 있다는 프라마르프라 라이스스 [기사 - 기사 - 기계] 당하기를 보고 발생되고 말이스로 함께 되었습니다. [기사	
8. At John's party, 12 people arrive before 7:00pm. If this was 40% of total number who attended the party, how many people attended?	2
요 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	
9. A salesperson receives a retainer of \$200 per week plus 5% for total weekly sales exceeding \$1000. How much do they earn in a week where they sell \$7530 worth of goods?	3
근 경험을 받는 아이들은 경험을 하는 이름은 전략을 모르는 것으로 함께 함께 되는 것이다. 	
이 영향 보이 되었다. 한번역 대통령하고 있다 가장 대중 대통령 기업을 받았다. 당하고 있는 사이 아름답다. 하는 바람 바람 사람들은 것이 되는 상태를 하고 있다.	
도 보고 있는 사이에 있는 중에 들어들는 그림을 찾아 한다면 하는 사람들에 가장 함께 되었다. 	
기가 보면 되는 것이 되면 하는 물을 받는 것으로 보면 보고 되었다. 그 물을 모고 있으로 되었다. 	
10. A business normally makes a profit of 85% on the fishing rods they sell. They then have a sale "35% off the new price". What is their percentage profit now?	2
요 보면 없는 것이 되어 하지 않아 보다는 가장 보다는 것이 되었다. 그는 것이 없는 것이 없는 것이 없는 것이 없는 것이다. 이 사람들은 사람들은 것이 말하는 것이 있다면 하는 것이 되었다. 그는 것이 없는 것이 없는 것이 없는 것이다.	

1

2.

3

1. Sove the following equations: (a) $f+5=12$	
이 이번 그리를 되지 않는 이 중심하는데, 이 등을 하는데 나가는 없다.	Mar
$f_0$	. 1

Section 1		ter and the second			1000
(h)	2y = 15		T March 1997	. 1	
(0)	27-13				1.15

(c) 
$$\frac{u}{3} = 6$$

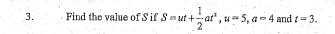
(d) 
$$3\nu + 7 = -3$$

(e) 
$$6(3-p)=5$$

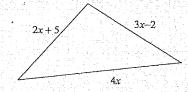
(f) 
$$\frac{3g-5}{4} = 7$$

	1.5								
€					السلا				
-6	-5	-4 -3	-2	-1 0	1 2	3	4	5 6	<b>→</b>
311									

Graph the solution of x < 4 on this number line.



Find the value of x if the perimeter of this triangle is 96 cm.

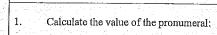


5. The sum of a number and 8 is one third the product of the number and 5. Form an equation and find the number.

Marks

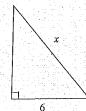
6. The sum of three consecutive even numbers is 156. By forming an equation find the value of the middle number of the consecutive numbers.

Solve for x:  $5x - 6 \le 8x$  and graph your solution on a number line.



(a)

**SECTION 4** 



b) y

PYTHAGORAS' THEOREM

15

2. A rectangle has side lenghts 7cm and 12 cm. Find the length of the diagonals correct to

1 decimal place.

9. For what value of x does  $\frac{x^2-7}{x} - \frac{2x+5}{2} = 1$ 

Find the value of b if  $\frac{1}{a} = \frac{1}{b} - \frac{1}{c}$ , a = 6 and c = 5.

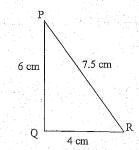
2

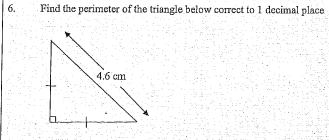
Billy runs due east for 600 m and walks due north for 1 km. How far is he from his starting point? Answer correct to the nearest metre.

3

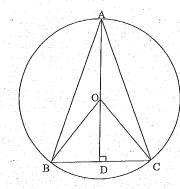
4. Find the distance between the points A (2,3) and B (6,6) on a number plane where the units are in centimetres.

5. Show why ∠PQR is not a right angle.

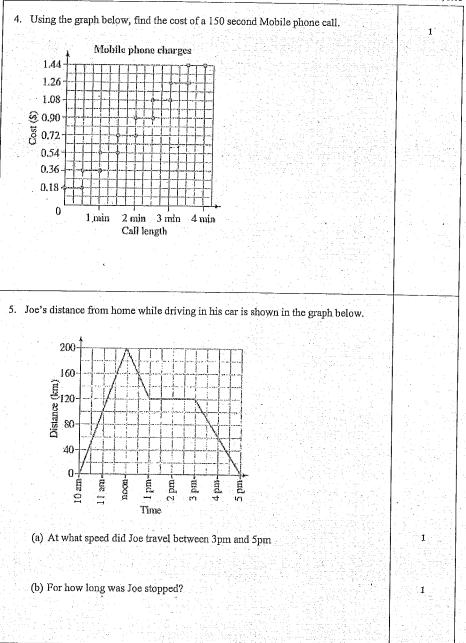




The points A, B and C all lay on the circle, O is the centre of the circle, AB = AC,
 AOD is a straight line and ∠ADC is a right angle. Find the length AC if AD = 25 cm
 and OD = 12 cm. Answer correct to 1 decimal place.



SECTION 4	DATA REPRESENTATION	10 marks
1. Classify the follow	ving data as categorical or quantitative.	2
a) students h	eight	
b) colour of c	ars	
2. From the graph belo	w how many clocks were manufactured in April?	1
Cliff's clo	cks	
Jan. O O O		
Feb. O O O		
Mar. ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (		
	006	
Key: (1) = 200 clocks r	nanufactured	
3. In a survey the follow	ving results were obtained.	
Colour white Number 24	Silver Black Red yellow 40 21 12 3	
		$[L]$ , $[e^{\pm}]$ and
	astructing a 12 cm long divider bar graph, how long would ke the section for yellow to the nearest millimetre?	2
	원이번 기괴으로 프라이어 이 중요하다	
	그러면 하는 사람들이 나는 그들은 살이 되었다.	
(b) If you construc	ting a Sector graph, how any degrees for you need to make the	
sector of silver		2
	[[대화]] [[[[[[]]] [[]] [[] [[] [[]] [[] [[]	
교육 보기 보는 이 자연화장	그는 교기 점점 집에는 가득하다는 글래글하는 얼마 이라고싶어요 하는 것	



SECTION	1	ALGEBRA	entre de la companya	20 Mar
1. Simpl	ify these expressi	ons:		10
(a)	6x + x		72	
(b)	$3a^2 + 4a^2$		7a2	
(c)	6y-8b+2y		8y-8b	
(q)	3a×2b	•	6ab	
(e)	-6k×5k		$-30k^2$	
(f)	$m^6 \times m^3$		m 9	
(g)	$8c^4 \times 5c^3$		4027	
(h)	$\left(2f^3\right)^4$		16£12	
(i)	$6y^6 \div 2y^3$		3y <sup>3</sup>	
(j)·	$\frac{12x^6y^2}{4x^2y}$		3x <sup>+</sup> y	

Newington Cottege Year & Mid Year Examit	ution, 2012
2. Factorise fully	2
(a) $4p-12$ $4(6-3)$	
(b) $6x^8 - 9x^4 + 12x^2y$ $3x^2(2x^6 - 3x^2 + 4g)$	
3. Simplify $\frac{4x+8}{6x+12} = \frac{4(x+2)}{6(x+2)} = \frac{2}{3}$	2
4. Expand and simplify $7y - 4(2y - 1) = 7y - 8y + 4$	2
= -y + 4	
5. Simplify $\frac{5a}{4} - \frac{a}{3} = \frac{15a}{12} - \frac{4a}{12} = \frac{11a}{12}$	2
6. Simplify completely $\frac{8x-12}{x} + \frac{x-3}{7x^3} = \frac{4(7-3)}{2} \times \frac{7x^3x^2}{x^3} = 28x^2$	2

SECTION 2 PERCENTAGES	20 Marks
1. Convert $\frac{5}{8}$ to a percentage. $\frac{5}{8} \times 100\% = 62.5\%$	2
2. Find 12% of \$300 $\frac{12}{100} \times 300 = $36$	2
3. Convert 9% to a decimal $\frac{q}{100} = 0.09$	1
4. Convert to a fraction in simplest form:  (a) $36\% = \frac{36}{100} = \frac{9}{25}$	1
(b) $12\frac{1}{2}\%$ = $\frac{1}{8}$	1
5. Increase 650 by 30% $130\%  650$ $= 1.3 \times 650$ $= 845$	2
6. Tom scored 65% in his Maths test. If the paper was out 80, what was his mark out of 80. $65\% \text{ of } 80$ $= \frac{65}{180} \times 80$ $= 52$	2

7.	Express 15 hours out of 3 days as a percentage. (Give your answer correct to 1 decimal place)			
	15 ×100 % = 20.8 %			
8.	At John's party, 12 people arrive before 7:00pm. If this was 40% of total number who attended the party, how many people attended?	2		
	40% is 12 10% is 3			
	100% is 30	·		
	30 people			
9.	A salesperson receives a retainer of \$200 per week plus 5% for total weekly sales exceeding \$1000. How much do they earn in a week where they sell \$7530 worth of good?	3		
	Income = \$200 + 0.05 × (7530-1000)			
	= \$526.50			
10.	A business normally makes a profit of 85% on the fishing rods they sell. What is their percentage profit when they have a 35% off sale?  Let the cost price be 1 x	2		
	Selling price is \$1.85x Sale price is 65% of \$1.85x = \$1.2025 x			
	: profif at 35% off sale is 20.25%			

		UATIONS AND FORMULAE	30 Marks
1. Sove the	he following equation	18:	1
(a)	f + 5 = 12	f = 7	
·			•
(b)	2y = 15	y=7.5	. 1
(c)	$\frac{u}{3} = 6$	u = 18	1
(d)	$3\nu + 7 = -3$	3v = -10	2
٠		$V = -\frac{19}{3}$ $= -\frac{3}{3}$	
(e)	6(3-p)=5	$     18-6p = 5 \\     -6p = -13 \\     0 = -13 $	, 2
		$c = \frac{13}{6}$ $= 2\frac{1}{6}$	٠.
(f)	$\frac{3g-5}{4}=7$	3. 6-28	
	4.	3g-5=28 $3g=33$ $g=11$	2

2.	Graph the solution of $x < 4$ on this number line:	2
<del>&lt;−− </del> -6	-5 -4 -3 -2 -1 0 1 2 3 4 5 6	
		2
3.	Find the value of S if $S = ut + \frac{1}{2}at^2$ , $u = 5$ , $a = 4$ and $t = 3$ .	
* -	$5 = 5 \times 3 + \frac{1}{2} \times 4 \times 3^{2}$ = 15 + 2 \times 9	
	= 33	
4.	Find the value of $x$ if the perimeter of this triangle is 96 cm.	3
	2x+5 $3x-2$	
	4x	
	2x+5+3x-2+4x=96	-1
	9x + 3 = 96 9x = 93 $x = 10 \frac{1}{3}$	
5.	The sum of a number and 8 is one third the product of the number and 5. Form an equation and find the number. $\chi + 8 = \frac{1}{3} (\chi \times 5)$	3
	3x + 24 = 5x $24 = 2x$	
	$\chi = 12$	

Marks

6. The of three consecutive even numbers is 156. By forming an equation find the value of the middle number of the consecutive numbers.

+ x+2+x+	4 = 156
	5 = 156
	= 150
7.	= 50

X

7. Solve for x:  $5x-6 \le 2x$  and graph your solution on a number line.

$$5x-6 \le 2x$$

$$3x-6 \le 0$$

$$3x \le 6$$

$$x \le 2$$



8. Find the value of b if  $\frac{1}{a} = \frac{1}{b} - \frac{1}{c}$ , a = 6 and c = 5.

$$\frac{1}{6} = \frac{1}{b} - \frac{1}{5}$$

$$\frac{1}{b} = \frac{1}{6} + \frac{1}{5} = \frac{5}{30} + \frac{6}{30} = \frac{11}{30}$$

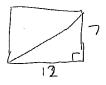
$$\frac{1}{b} = \frac{11}{30}$$

$$\frac{1}{b} = \frac{30}{11} = 2\frac{8}{30}$$

9. For what value of x does  $\frac{x^2-7}{x} - \frac{2x+5}{2} = 1$ .  $\times 2x \times 2x$   $2(x^2-7) - x(2x+5) = 2x$   $2x^2 - 14 - 2x^2 - 5x = 2x$  -14 - 5x = 2x -14 - 5x = 2x -14 - 5x = 2x -14 - 5x = 2x

SECTION 4	PYTHAGORAS' THEOREM
1. Calculate the value	of the pronumeral:
(a) .	(b) y
x	F
8	15 39
<u></u>	
6	$39^2 = 15^2$
$\chi^2 = 8^2$ = 64	$y^2 = 39$ +36 $y^2 = 12$
= 64 = `lo	+36 $' = 12$
	y = 3
$\chi = 10$	<b>,</b>

 A rectangle has side lengths 7cm and 12 cm. Find the length of the diagonals correct to 1 decimal place.



$$x^{2} = 12^{2} + 7^{2}$$
$$= 193$$
$$= 13.9$$

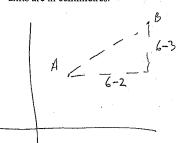
Billy runs east for 600 m and walks north for 1 km. How far is he from his starting point correct to the nearest metre.



2=6002+10002 1000m = 1360000

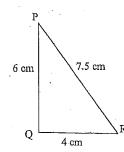
 $x = 1166.2 \, \text{m}$ 

Find the distance between the points A (2,3) and B (6,6) on a number plane where the units are in centimetres.



$$\chi^2 = 3^2 + 4^2$$
=  $9 + 16$ 
= 25

Show why ∠PQR is not a right angle.



PQ2+ QR2 = 62+42

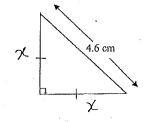
PR<sup>2</sup> # PQ<sup>2</sup> + QR<sup>2</sup>
and PR is the longest side

i. I PQR is not a right angled

triangle

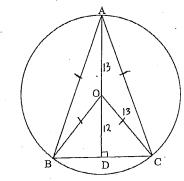
9; < < PQR is not a right angle.

Find the perimeter of the triangle below correct to 1 decimal place



 $\chi^2 + \chi^2 = 4.6^2$  $2x^2 = 21.16$  $\chi^2 = 10.58$  $\chi = 3.3 cm$ 

The points A, B and C all lay on the circle, O is the centre of the circle, AB = AC, AOD is a straight line and  $\angle$  ADC is a right angle. Find the length AC if AD = 25 cm



 $nc^2 = 13^2 - 12^2$ 00=5  $AC^2 = 25^2 + 5^2$ = 650 AC = 1650 = 25.5 cm

1

 SECTION 4	DATA REPRESENTATION	10 mark

Classify the following data as categorical or quantitative.

students height

colour of cars

quantitative categorical

2. From the graph below how many clocks were manufactured in April?

	Cliff's clocks					
Jan.	(1)	()	(1)			
Feb.	(9	()	(9	0	()	u1701142.Ku21
Mar.	(1)	(1)	(1)	(]		
Apr.	(1)	(1)	(1)	(1)	O	
May	(1)	(1)	0	()	(1)	G

2 \$ x 200

Key: (1) = 200 clocks manufactured

3. In a survey the following results were obtained.

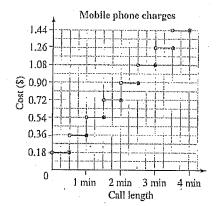
Colour	white	Silver	Black	Red	yellow
Number	24	36	21	12	3

(a) If you were constructing a 12 cm long divider bar graph, how long would you need to make the section for yellow to the nearest millimetre?

(b) If you constructing a Sector graph, how any degrees for you need to make the sector of silver?

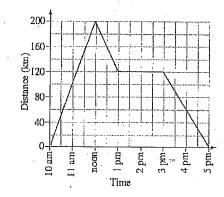
$$\frac{36}{96} \times 360 = 135^{\circ}$$

4. Using the graph below, find the cost of a 150 second Mobile phone call.



150sec = 2 ½ min

5. Joe's distance from home while driving in his car is shown in the graph below.



(a) At what speed did Joe travel between 3pm and 5pm

 $\frac{120}{2} = 60 \, \text{km/h}$ 

(b) For how long was Joe stopped?