St Stephen's School – Carramar Campus www.mathxtc.com
Year 10 Mathematics Extension **Test 2: Function Study**
Total Marks: 57 **Time Allowed: 65 mins** **Resources: mixed**

Name: _____ **Mark:**

Teacher:_____

Parent Signature:

INSTRUCTIONS
Permitted equipment:

- No calculators are permitted
- Both sides of one A4 page of notes
- Stationery and drawing equipment

Question 1. [6 marks]
For each of the following, what is the value of a?

a. $a = 3x + 5$ (when $x = 12$)

$a = 3 \times 12 + 5$ ✓
$= 41$ ✓

b. $a = -2x^2 - 3y^3$ (when $x = -4$ and $y = -2$)

$a = -2(-4)^2 - 3(-2)^3$ ✓
$= -2 \times 16 - 3 \times -8$
$= -32 + 24$
$= -8$ ✓

c. $k = \sqrt{5p - 13a}$ (when $k = 4$ and $p = -2$)

$4 = \sqrt{5 \times -2 - 13a}$ ✓
$4 = \sqrt{-10 - 13a}$
$16 = -10 - 13a$
$26 = -13a$
$a = -2$ ✓

Question 2. [6 marks]

Transpose the following formulas to make t the subject:

a. $v = u + at$

$v - u = at$ ✓

$t = \frac{v-u}{a}$ ✓

b. $\frac{1}{5} = \frac{p-1}{t}$

$t = 5(p-1)$ ✓✓

c. $\frac{a}{2} + \frac{t}{5} = \frac{3b}{2}$

$\frac{t}{5} = \frac{3b}{2} - \frac{a}{2}$ ✓

$t = 5\left(\frac{3b}{2} - \frac{a}{2}\right)$ ✓

Question 3. [6 marks]

Simplify these expressions:

a. $6x + 9x - 3x$ $= 15x - 3x$ ✓

$= 12x$ ✓

b. $7a^2 + 28a + 4 - 9a^2 + 12ab - 4$

$= -2a^2 + 28a + 12ab$ ✓✓

c. $6d^3 \times 2e^4 \times 10e^2 \times d$ $= 120d^4e^6$ ✓✓

Question 4. [4 marks]

What is the highest common factor of

a. $2g$ and $6g$ HCF $= 2g$ ✓✓

b. $42f^2h$ and $18h^3$ HCF $= 6h$ ✓✓

Question 5. [6 marks]

Expand these expressions (i.e. write them without brackets)

a. $5(a+5)$ $= 5a + 25$ ✓✓

b. $3b(7-5b)$ $= 21b - 15b^2$ ✓✓

c. $-2xy(3x-5y+6x^2)$ $= -6x^2y + 10xy^2 - 12x^3y$ ✓✓

Question 6. [4 marks]

Factorise the following (i.e. put the highest common factor outside brackets)

a. $5x+10y$ $= 5(x+2y)$ ✓✓

b. $14a^2-42a$ $= 14a(a-3)$ ✓✓

Question 7. [6 marks]

Complete the output table for the function

a. $f(x)=5x-8$

x	0	1	2
$f(x)$	-8	-3	2

✓ ✓ ✓

b. $g(c)=c^2+3c+1$

c	-2	1	5
$g(c)$	-1	5	41

✓ ✓ ✓

Question 8. **[2 marks]**

For $h(x, y) = 3x + 2y$ evaluate $h(-1, 5)$

$h(-1,5) = 3\times -1 + 2\times 5$ ✓

$= -3 + 10$

$= 7$ ✓

Question 9. **[6 marks]**

For each function given, choose one or more values for x, find the corresponding value(s) for y, and then use your results to clearly match the function with a line on the calculator screenshot. (Space is provided for 3 sets of values for x and y, but you should only use what you need; you don't have to fill every space.)

a. $y = x + 1$

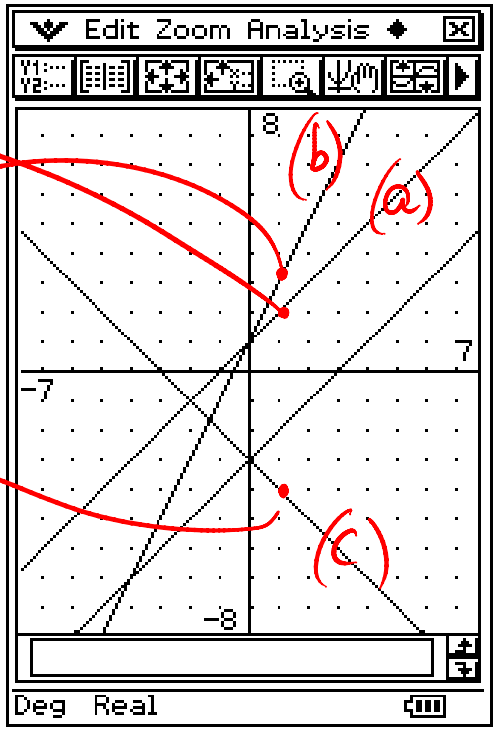
x	1		✓
y	2		

b. $y = 2x + 1$

x	1	✓	
y	3		

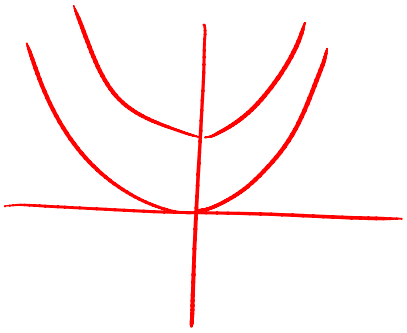
c. $y = -x - 3$

x	1	✓	
y	-4		



Question 10. [2 marks]

a. Using a sketch, briefly explain the difference between the graph of $y = x^2$ and $y = x^2 + 5$



✓

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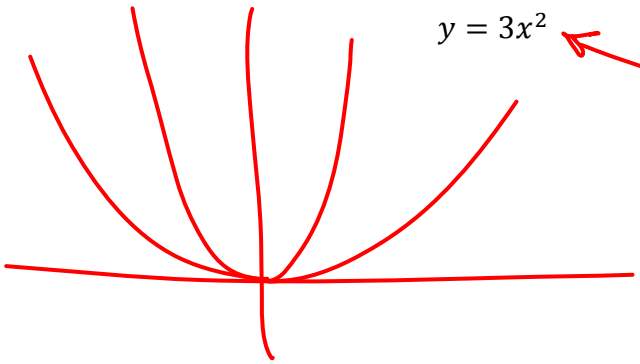
b. Using a sketch, briefly explain the difference between the graph of $y = x^2$ and $y = 3x^2$



✓

Question 11. [3 marks]

Transpose the following formula to make r the subject:

$\frac{r}{p^2} = \frac{r}{q} + 1$

$\frac{r}{p^2} - \frac{r}{q} = 1$ ✓

$\frac{qr - p^2r}{p^2q} = 1$ ✓

$qr - p^2r = p^2q$

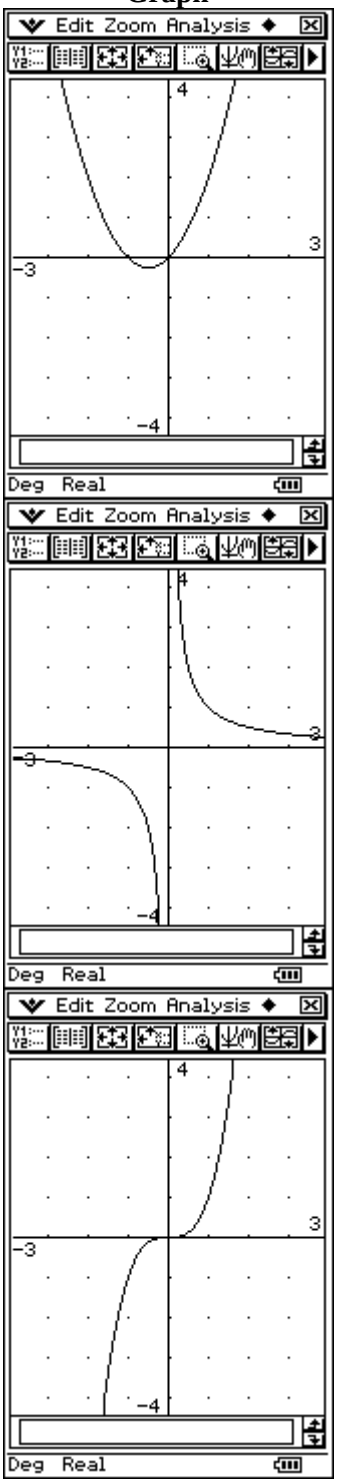
$r(q - p^2) = p^2q$

$r = \frac{p^2q}{q - p^2}$ ✓

Question 12. [4 marks]

Match description, function and graph:

Description	**Function**	**Graph**
Quadratic function	$y = x^3$	
Cubic function	$y = x^2 + x$	
Hyperbolic function	$y = \frac{1}{x}$	



Question 13. [2 marks]

Factorise:

$$-28x^2z^3 - 12xy^2z - 16x^3y^3z^2$$

$-4xz(7xz^2 + 3y^2 + 4x^2y^3z)$ √√

or $4xz(-7xz^2 - 3y^2 - 4x^2y^3z)$