



education

Department of  
Education  
FREE STATE PROVINCE

**GRADE 9**

**MATHEMATICS**

**NOVEMBER TEST 2022**

**PAPER 1**

**DURATION 1 HOUR 30 MINUTES**

*Stanmorephysics.com*

**MARKS: 60**

INSTRUCTION AND INFORMATION

Read all the instructions carefully

1. Answer ALL questions..
2. Clearly show ALL calculations, diagrams, graphs, etc. that you used to determine the answer.
3. Number the answers correctly according to the numbering system used in this question paper.
4. You may use an approved scientific calculator (non-programmable and non-graphical) unless stated otherwise
5. Diagrams are NOT necessarily drawn to scale.
6. Answers only will NOT necessarily be awarded full marks.
7. Write neatly and legible.

QUESTION 1

- 1.1 The temperature at Golden gate is  $-5^{\circ}\text{C}$ . It increases by  $4^{\circ}\text{C}$ . What is the new temperature? (1)
- 1.2 The sum of two numbers is  $-1$  and their product is  $-12$ . Find the two numbers. (2)
- 1.3 Simplify the following:  $2(-2) - \sqrt[3]{27} + (-3)^3$  (4)
- 1.4 Use prime factors to find the HCF and the LCM of 300 and 135 (4)

[11]

QUESTION 2

- 2.1 Simplify the following ratio:  $120c : 30c$  (1)
- 2.2 Show by calculations which deal is cheaper: 30 milk chocolate bars for R270 or 42 mint chocolate bars for R320. (3)
- 2.3 In a bag of marbles there are blue and pink marbles in the ratio 3:11. If there are 18 blue marbles, how many marbles are in the bag? (3)
- 2.4 Simplify the following **WITHOUT** the use of a calculator
- 2.4.1  $a^x \times a^{x-1} \times a^2$  (1)
- 2.4.2  $\frac{(3 \cdot 2^2)^3}{2^2 \cdot 3^5}$  (3)

[11]

QUESTION 3

- 3.1 Simplify the following
- 3.1.1  $x^2 - 5x - 11 + 3x^2 - 5x + 6$  (2)
- 3.1.2  $(x + 3)(x - 4)$  (3)
- 3.2 Factorise the following
- 3.2.1  $3(y + 2) - x(y + 2)$  (2)
- 3.2.2  $4x^3 - 4x$  (3)
- 3.3 Find the value of p if  $(x - 4)$  is a factor of  $x^2 - px + 20$  (3)
- 3.4 Simplify:  $\frac{x^2 + xy - 2y^2}{x^2 - y^2}$  (3)

[16]

QUESTION 4

Solve for  $x$ :

4.1  $35 + x = 75$  (1)

4.2  $12x - 10 = 6x + 32$  (2)

4.3  $2^{x+1} = 1$  (2)

4.4  $\frac{x-11}{2} - 5 = \frac{x+2}{6}$  (3)

[8]

QUESTION 5

5.1 Study the pattern below and **write down** the 7<sup>th</sup> and 9<sup>th</sup> term (2)

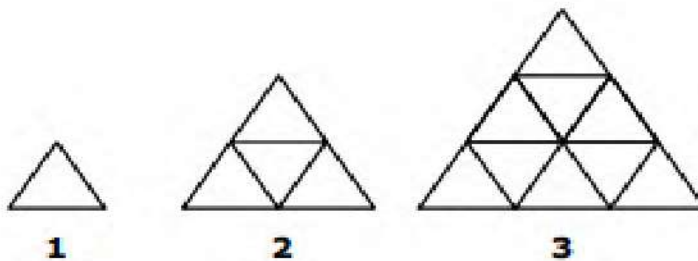
$$\frac{1}{2}; 1; \frac{3}{2}; 2; \frac{5}{2}; 3; \dots$$

5.2 Consider the pattern: 14; 12; 10; 8; ...

5.2.1 Write the general rule ( $T_n$ ) for the pattern. (2)

5.2.2 Which term has the value of  $-74$  (2)

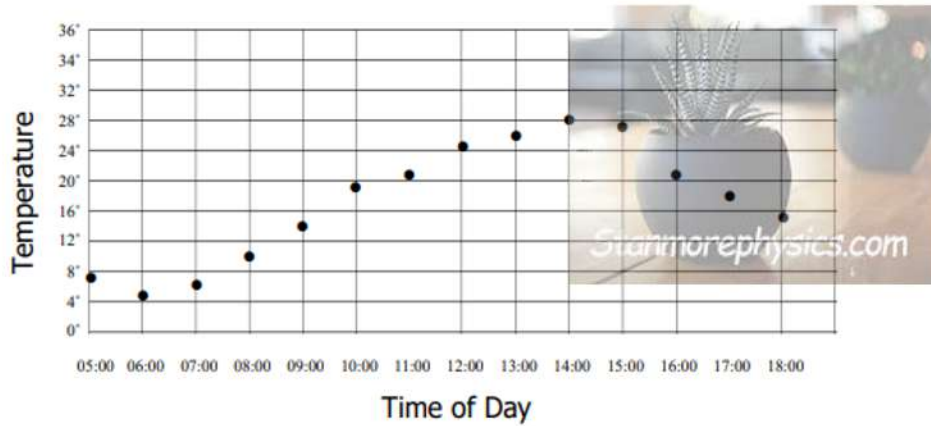
5.3 Study the pattern below and find the general rule (1)



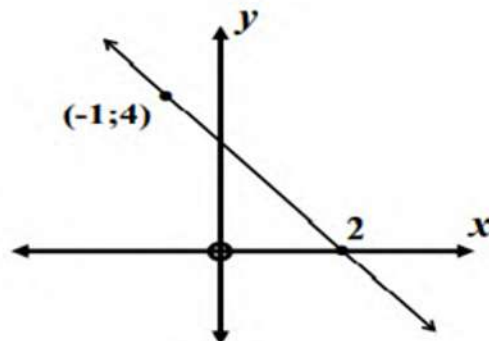
[7]

QUESTION 6

6. The graph below shows the temperature on a certain day taken every hour.



- 6.1 Is the data discrete or continuous? (1)
- 6.2 Sketch the graph of  $y = 2x - 4$  (3)
- 6.3 Determine the equation of the graph below (3)



[7]

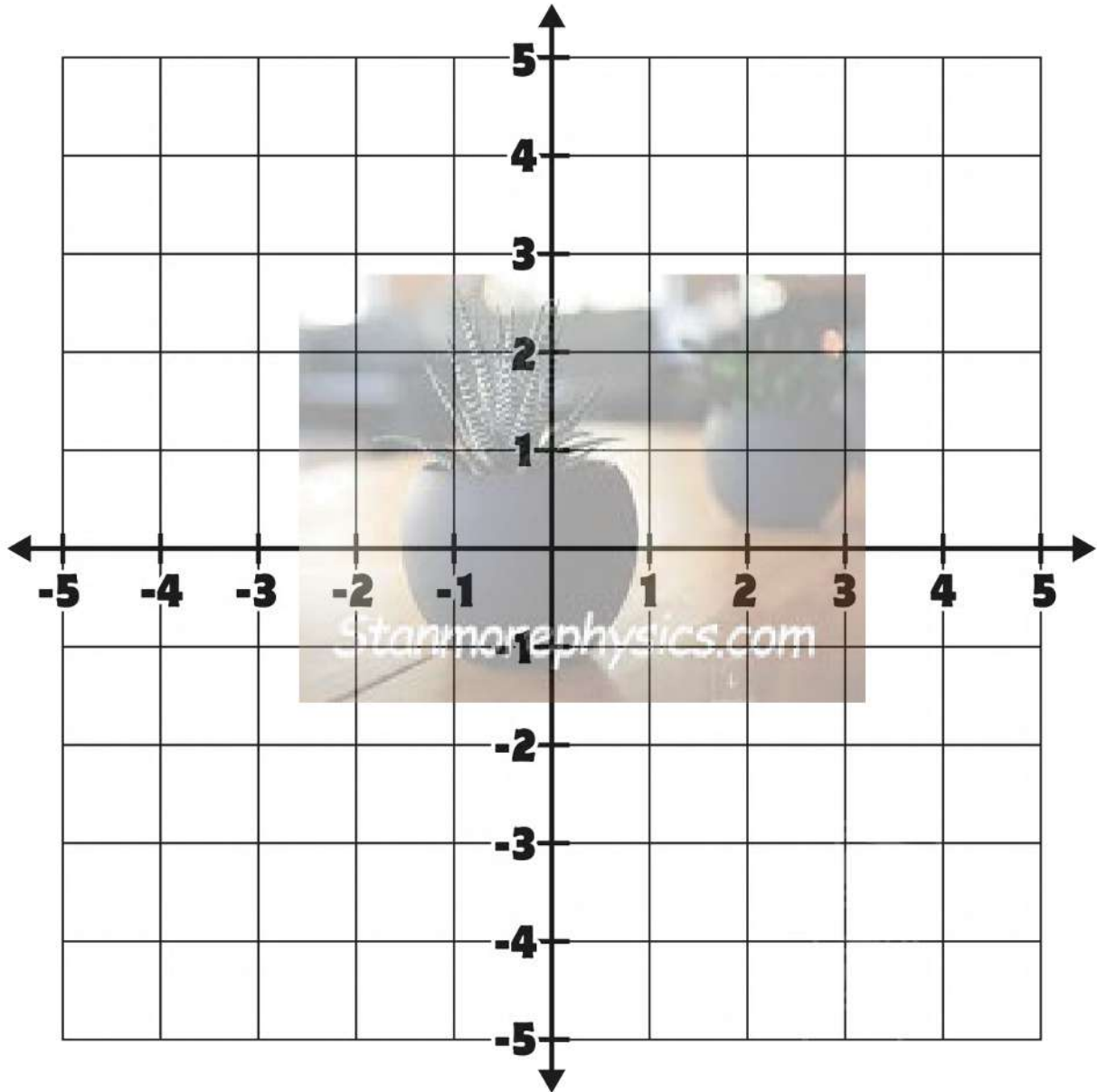
TOTAL [60]

NAME: \_\_\_\_\_

GRADE 9: CLASS: \_\_\_\_\_

ANNEXURE A

6.2







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**GRADE 9**

**MATHEMATICS**

**MARKING GUIDELINES 2022**

**PAPER 1**

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**MARKS: 60**

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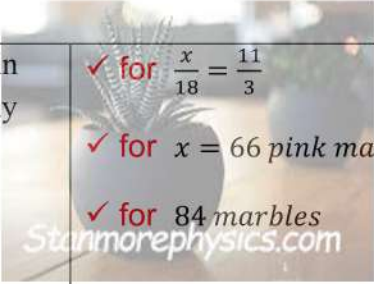
QUESTION 1

1.1	<p>The temperature at Golden gate is <math>-5^{\circ}\text{C}</math>. It increases by <math>4^{\circ}\text{C}</math>. What is the new temperature?</p> $-5 + 4 = -1$	<p>✓ for <math>-1</math></p>	1																						
1.2	<p>The sum of two numbers is <math>-1</math> and their product is <math>-12</math>. Find the two numbers?</p> $3 + (-4) = -1 \quad \text{and} \quad 3 \times (-4) = -12$	<p>✓ for 3 ✓ for <math>-4</math></p>	2																						
1.3	<p>Simplify the following WITHOUT the use of a calculator</p> $2(-2) - \sqrt[3]{27} + (-3)^3$ <p style="text-align: right;">CA</p> $= -4 - 3 - 27$ $= -34$	<p>✓ for <math>-4</math> ✓ for <math>-3</math> ✓ for <math>-27</math> ✓ for <math>-34</math></p>	4																						
1.4	<p>Use prime factors to find the HCF and the LCM of 300 and 135</p> <table border="1" style="display: inline-table; margin-right: 20px;"> <tbody> <tr><td>2</td><td>300</td></tr> <tr><td>2</td><td>150</td></tr> <tr><td>3</td><td>75</td></tr> <tr><td>5</td><td>25</td></tr> <tr><td>5</td><td>5</td></tr> <tr><td></td><td>1</td></tr> </tbody> </table> <table border="1" style="display: inline-table;"> <tbody> <tr><td>3</td><td>135</td></tr> <tr><td>3</td><td>45</td></tr> <tr><td>3</td><td>15</td></tr> <tr><td>5</td><td>5</td></tr> <tr><td></td><td>1</td></tr> </tbody> </table> $300 = 2^2 \times 3 \times 5^2$ $135 = 3^3 \times 5$ $\text{HCF} = 3 \times 5 = 15$ $\text{LCM} = 5^2 \times 2^2 \times 3^3 = 2700$	2	300	2	150	3	75	5	25	5	5		1	3	135	3	45	3	15	5	5		1	<p>✓ for prime factors <math>2^2 \times 3 \times 5^2</math> ✓ for prime factors <math>3^3 \times 5</math> ✓ for HCF = 15 ✓ for LCM = 2700</p>	4
2	300																								
2	150																								
3	75																								
5	25																								
5	5																								
	1																								
3	135																								
3	45																								
3	15																								
5	5																								
	1																								
			<b>[11]</b>																						

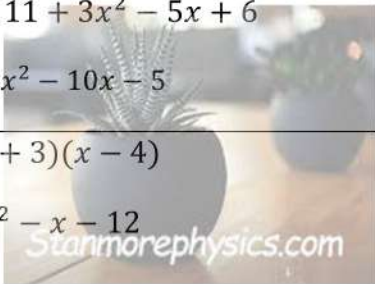
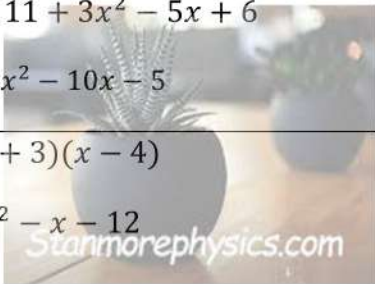


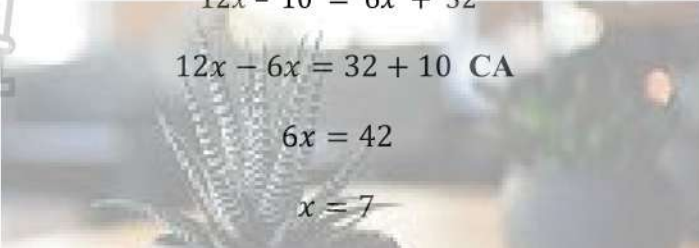
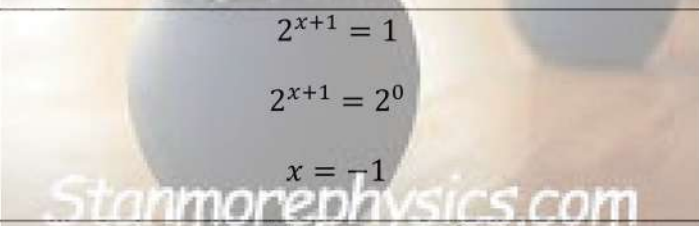
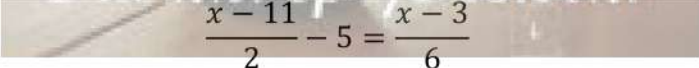
**QUESTION 2**

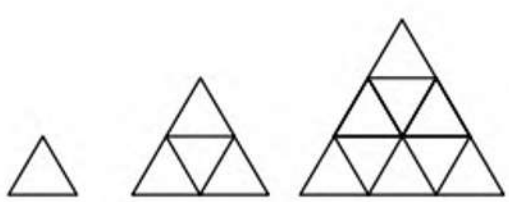
2.1	Simplify the following ratio $120c : 30c$  $4:1$	✓ for $4:1$	1
2.2	Show by calculations which deal is cheaper? 30 milk chocolate bars for R270 or 42 mint chocolate bars for R320.  $\text{Milk chocolate cost} = \frac{R270}{30} =$ $R9 \text{ per bar}$ and  $\text{Mint chocolate cost} = \frac{320}{42} =$ $R7.62 \text{ per bar}$  $\therefore 42 \text{ mint chocolate bars is the cheapest}$	✓ for Cost of milk chocolate bar = R9  ✓ for Cost of Mint chocolate bar = R7,62  ✓ for Mint chocolate bars is cheaper	3

2.3	<p>In a bag of marbles there are blue and pink marbles in the ratio 3:11. If there are 18 blue marbles, how many marbles are in the bag?</p> <p>Blue: Pink 3 : 11 18 : <math>x</math></p> $\frac{x}{18} = \frac{11}{3} \quad \text{CA}$ $x = \frac{11}{3} \times 18$ $x = 66 \text{ pink marbles}$ $\therefore \text{Total} = 18 + 66 = 84 \text{ marbles}$		3
2.4	Simplify the following WITHOUT the use of a calculator		
2.4.1	$a^x \times a^{x-1} \times a^2$ $= a^{2x+1}$	✓ for $a^{2x+1}$	1
2.4.2	$\frac{(3 \cdot 2^2)^3}{2^2 \cdot 3^5}$ $= \frac{3^3 \cdot 2^6}{2^2 \cdot 3^5} \quad \text{CA}$ $= 3^{-2} \times 2^4 \quad \text{or} \quad \frac{16}{9}$	✓ for $3^3 \cdot 2^6$ ✓ for $3^{-2} \times 2^4$ or $\frac{16}{9}$	2
			<b>[10]</b>

QUESTION 3

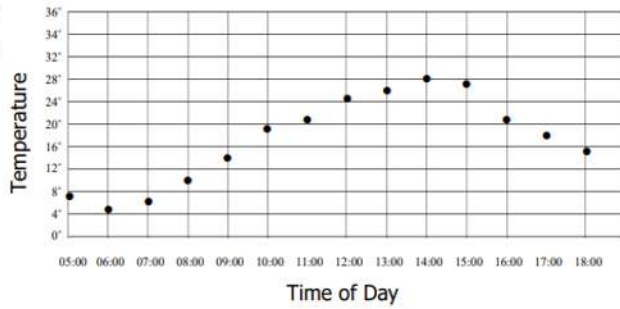
3.1	Simplify the following			
3.1.1	$x^2 - 5x - 11 + 3x^2 - 5x + 6$ $= 4x^2 - 10x - 5$		✓ for $4x^2$ ✓ for $-10x$	2
3.1.2	$(x + 3)(x - 4)$ $x^2 - x - 12$		✓ for $x^2$ ✓ for $-x$ ✓ for $-12$	3
3.2	Factorise the following fully			
3.2.1	$3(y + 2) - x(y + 2)$ $(y + 2)(3 - x)$		✓ for $(y + 2)$ ✓ for $(3 - x)$	2
3.2.2	$4x^3 - 4x$ $= 4x(x^2 - 1)$ $= 4x(x - 1)(x + 1)$		✓ for common factor $4x$ ✓ for $(x^2 - 1)$ ✓ for $4x(x - 1)(x + 1)$	3
3.3	Find the value of p if $(x - 4)$ is a factor of $x^2 - px + 20$ $x^2 - px + 20$ $= (x - 4)(x - 5)$ $-5x - 4x = -px$ $-9x = px$ $\therefore p = 9$		✓ for $((x - 4)(x - 5))$ ✓ for $-5x - 4x = -px$ ✓ for $p = 9$	3
3.4	Simplify		✓ for $(x - y)(x + 2y)$ ✓ for $(x - y)(x + y)$ ✓ for $\frac{(x+2y)}{(x+y)}$	
	$\frac{x^2 + xy - 2y^2}{x^2 - y^2}$ $\frac{(x - y)(x + 2y)}{(x - y)(x + y)}$ $= \frac{(x + 2y)}{(x + y)}$			3
				[16]

	Solve for x		
4.1	$35 + x = 75$ $x = 40$	✓ for $x = 40$	1
4.2	 $12x - 10 = 6x + 32$ $12x - 6x = 32 + 10 \text{ CA}$ $6x = 42$ $x = 7$	✓ for $6x = 42$ ✓ for $x = 7$	2
4.3	 $2^{x+1} = 1$ $2^{x+1} = 2^0$ $x = -1$	✓ for $2^0$ ✓ for $x = -1$	2
4.4	 $\frac{x - 11}{2} - 5 = \frac{x - 3}{6}$ <p>multiply by <math>LCD = 6</math></p> $3(x - 11) - 30 = x - 3 \text{ CA}$ $3x - 33 - 30 = x - 3$ $2x = 60$ $x = 30$	✓ for $LCD = 6$ ✓ for $3(x - 11) - 30 = x - 3$ ✓ for $2x = 60$ ✓ for $x = 30$	4
			[9]

QUESTION 5			
5.1.	Study the patterns below and write down the 7 <sup>th</sup> and 9 <sup>th</sup> term  $\frac{1}{2}; 1; \frac{3}{2}; 2; \frac{5}{2}; 3; ..$ $\frac{7}{2}; \frac{9}{2}$	✓ for $\frac{7}{2}$  ✓ for $\frac{9}{2}$	2
5.2.	Consider the pattern: 14; 12; 10; 8; ...  5.2.1 Write the general rule ( $T_n$ ) for the pattern  $T_n = -2n + 16$	✓ for $-2n$  ✓ for $+16$	2
5.2.2	Which term has the value of $-74$  $-2n + 16 = -74 \quad \text{CA}$ $n = 45$	✓ for $-2n + 16 = -74$  ✓ for $n = 45$	2
5.3.	Study the pattern below and find the general rule  <div style="text-align: center;">  <p style="margin: 0;"><b>1</b>                      <b>2</b>                      <b>3</b></p> </div> $T_{n=n^2}$	✓ for $T_n = n^2$	1
			[7]

**QUESTION 6**

6.1 The graph below shows the temperature on a certain day taken every hour.



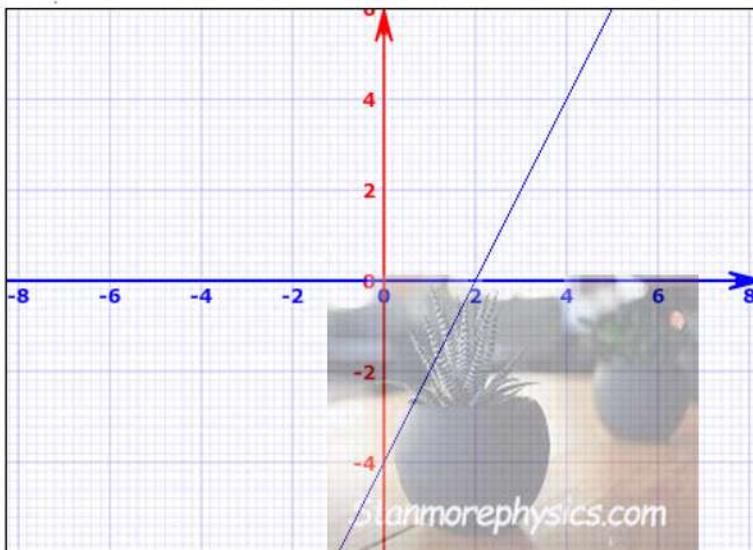
Is the data discrete or continuous?

Discrete

✓ for discreet

1

6.2 Sketch the graph of  $y = 2x - 4$



✓ for x- intercepts

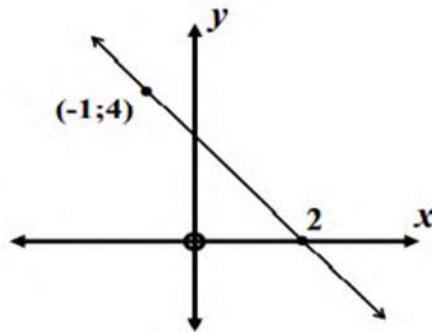
✓ for y - intercept

✓ for straight line

3



6.3 Determine the equation of the graph below



$$\text{Gradient} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{4 - 0}{-1 - 2}$$

$$m = -\frac{4}{3}$$

Substitute  $m$  and  $(-1; 4)$  on the line to find  $c$

$$y = mx + c$$

$$4 = -\frac{4}{3}(-1) + c$$

$$c = 4 - \frac{4}{3}$$

$$c = \frac{8}{3}$$

$$\therefore y = -\frac{4}{3}x + \frac{8}{3}$$

✓ for gradient  $(-\frac{4}{3})$

✓ for y-intercept  $(\frac{8}{3})$

✓ for  $y = -\frac{4}{3}x + \frac{8}{3}$

3

[7]

TOTAL 60