

Year 11

Lockdown

Workbook

Maths & English

This is Free

Please Take This Home to your Year 11 Child



Kia ora, Talofa lava, Kia ora, Fakaalofa lahi atu,
Kia orana, Ni sa bula Vinaka, Namaste,
Malo e lelei, Kam na Mauri, la orana,
Talofa koutou, Taloha ni, Sa-laam, Hello, and Warm
Greetings to you

Hopefully lockdown is going OK for you, and also for those
who live with you.

If you are worried or concerned about something or
anything please text or phone our Leonie Johnson, our
Guidance Counsellor, on 021 871 094

She and our amazing Health & Wellbeing Team are on-call to
you, and can help with all sorts of things.

This workbook has different activities from Maths, English, and
Science.

You should start at the front of each section and work your way
through. In some places you can write into the booklet. In others
you will need to write this in your own exercise book or on your
own paper please.

If you have any questions please email your Teacher.

Please bring this all of this work back with you when you return
to school.

Some of you will also have Google Classrooms for some of your
classes. Please join these if you can. Our school website has
more information about these classes and learning in lockdown.

Please look after yourself and those around you. Remember the importance
of this lockdown and why we are all doing it.

Please keep yourself and others safe by regular handwashing or sanitising;
safe sneezing, wearing a face-mask when you are out.

If you or someone you know has symptoms, please encourage them to get a
Covid test.

Arohanui and

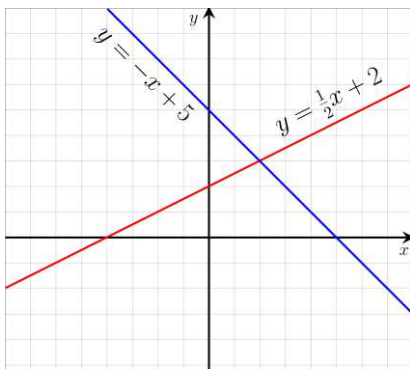
Mathematics

Faculty

Year 11

11

AS91029 Linear Algebra Workbook



$$2x + 5 = 15$$




$$\begin{array}{r} -5 \\ 2x + 5 = 15 \\ \hline 2x + 0 = 10 \end{array}$$

$$2x = 10$$

Your Name: _____

Your Maths Teacher: _____

AS91029 (1.4) Linear Algebra Workbook – Contents

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1. I am able to substitute values into a formula

- In algebra, substitution means to replace **variables(letters)** with **numbers**.
- It is important to remember **BEDMAS(order of operations)** when doing this.

Examples:

1. If $c = 5$, $d = 3$ and $e = -2$, find the value A of:

a). $A = 4d - e$

Ans: $A = 4 \times 3 - -2$

$$= 12 + 2$$

$$= 14.$$

b). $A = c(d - 4e)$

Ans: $A = 5(3 - 4 \times -2)$

$$= 5(3 - -8)$$

$$= 66$$

c). $A = \frac{3d+c}{e}$

Ans: $A = \frac{3 \times 3 + 5}{-2}$

$$= \frac{14}{-2}$$

$$= -7$$

Exercise 1

If $u = 3$, $v = 8$ and $w = 10$, calculate the values of A .

1. $A = 5u + v$

2. $A = 4v + 3u$

3. $A = v(w - u)$

4. $A = w(2u - 5) + v$

5. $A = 2v - w(u - 3u)$

6. $A = \frac{w}{2}(3v - 2u)$

7. $A = \frac{w-u}{4}$

8. $A = \frac{w(v+u)}{5}$

9. $A = \frac{2u-v}{w}$

10. Find the value of y in the formula $y = 2a + b$ when $a = 2.5$ and $b = 4.8$.

11. Use the formula $C = 40t + 50$ to calculate C for $t = 25$.

12. $P = 3.5a + 6b$. Calculate b if $P = 26$ and $a = 4$.

13. Give the formula $T = 75d + 180$.

a). Calculate T when $d = 26$. _____

b). Calculate d when $T = 1020$. _____

2. I am able to solve equations involving two steps

Rules for solving equations:

- Always do the same to both sides
- Collect all the variables on one side and numbers on the other side
- When you want to get rid of something, do the opposite operation.
- Do the adding and subtracting before the multiplying or dividing.

Examples:

$$\begin{aligned}x + 5 &= 40 \\x &= 40 - 5 && \text{(minus 5)} \\x &= 35\end{aligned}$$

$$\begin{aligned}3 - 4x &= 15 \\-4x &= 15 - 3 \\-4x &= 12 \\x &= 12 \div (-4) \\x &= -3\end{aligned}$$

$$\begin{aligned}2x - 3 &= 12 \\2x &= 12 + 3 && \text{(plus 3)} \\2x &= 15 \\x &= 15 \div 2 && \text{(divide by 2)} \\x &= 7.5\end{aligned}$$

Exercise

Solve the following equations:

1. $x + 9 = 21$

2. $10 - x = 15$

3. $3x + 4 = 10$

4. $4x - 1 = 19$

5. $16 + 3x = 28$

6. $8x + 4 = 7$

7. $2.5x + 3 = 6$

8. $120 - 5x = 135$

9. $18 = -2x + 25$

10. $3x = 64 - x$

11. $\frac{1}{2}x + 3 = 5$

12. $6x - 4 = -15$

13. $14 - 5x = 0$

14. $3x + 12 = 0.67$

3. I am able to form and solve equations

Write an equation and solve it for each of these.

1. If 7 is added to x the result is 12 _____

2. If 9 is subtracted from y the result is 11 _____

3. If x is multiplied by 4 the result is 20 _____

4. If y is divided by 2 the result is 8 _____

5. If x is subtracted from 10 the result is 13 _____

6. I think of a number, say x , multiply it by 4 and then add 5. The result is 21

7. Double a number and then subtract 6. The result is 14 _____

8. Tui doubles his weight and then subtracts 12. The result is 128kg. What is Tui's weight.

9. A garden has a width of t metres and a length of $2t + 4$ metres.

a) write an expression for the perimeter of the garden _____

b) The perimeter of the garden is 38 metres. Write an equation to show this _____

c) Solve your equation to find the value of t _____

10. Junior hire's out bicycles. The bike's cost \$5 per hour to hire plus a booking fee of \$3.

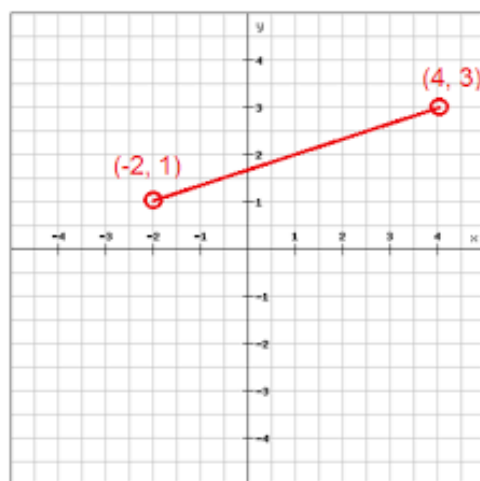
a) write an expression for the cost of Bike hire _____

b) Tala paid \$38 for bike hire. Use your equation to find out how many hours she hired the bike for _____

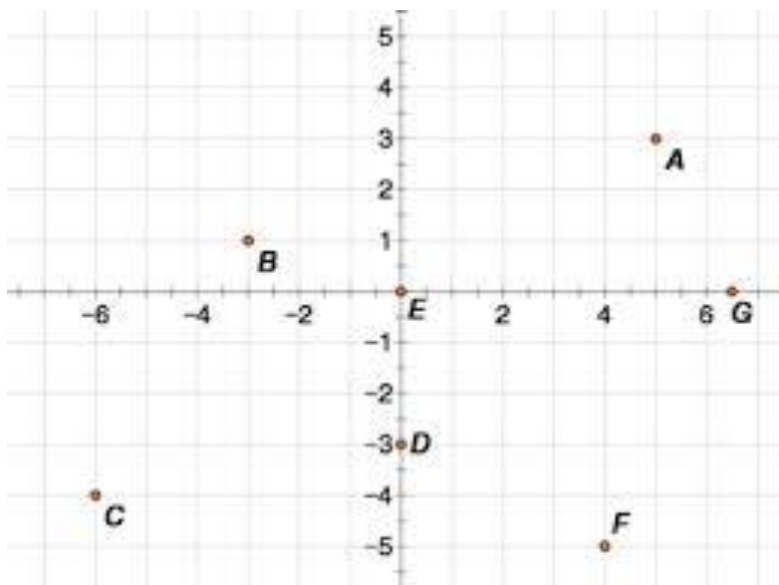
4. I am able to draw and read coordinates

Key Ideas :

- Coordinates allow us to record the position of something
- They are written as 2 numbers, e.g (3 , 5)
- The first number is how far across we go, the second number, how far up/down. To help you remember, think of “a baby has to crawl before it can climb”



1. Write down the coordinates of the points marked on the diagram.



A = (,)

B = (,)

C = (,)

D = (,)

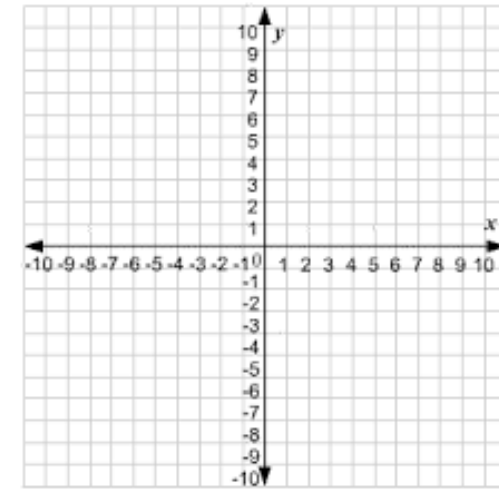
E = (,)

F = (,)

EXERCISE(A) :

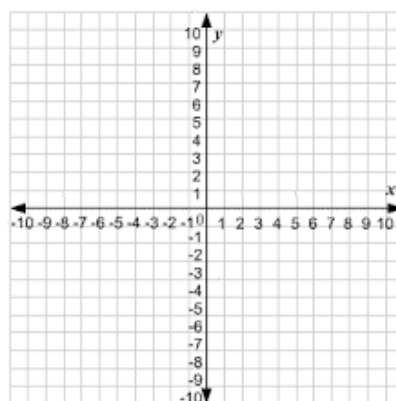
1. Plot and label the following coordinate points on the grid·

1. $(-3,2)$
2. $(4,3)$
3. $(-1,-5)$
4. $(-4,-2)$
5. $(3,6)$
6. $(2,-5)$



2. Plot and label the following coordinate points on the grid·

1. $(0,2)$
2. $(2,-3)$
3. $(-6,-5)$
4. $(4,-2)$
5. $(3,-6)$
6. $(2,0)$



5. I am able to draw straight lines by plotting points

To draw a line, we first need to find the coordinates of points that we can join together.

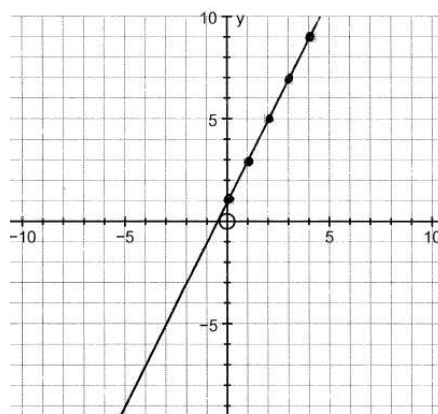
Example → Plot the line given by the equation $y = 2x + 1$

First calculate some points

e.g when $x = 1$, $y = 2 \times 1 + 1 = 3$

x	$2x + 1$	y	point
0	$2 \times 0 + 1$	1	(0, 1)
1	$2 \times 1 + 1$	3	(1, 3)
2	$2 \times 2 + 1$	5	(2, 5)
3	$2 \times 3 + 1$	7	(3, 7)
4	$2 \times 4 + 1$	9	(4, 9)

Plot the points and join them together with a straight line

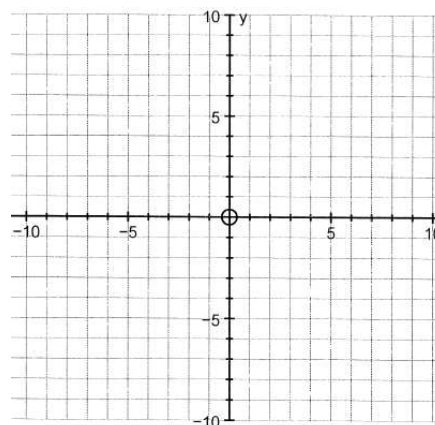


Exercise

Fill in the table, then plot the graph for each of the following

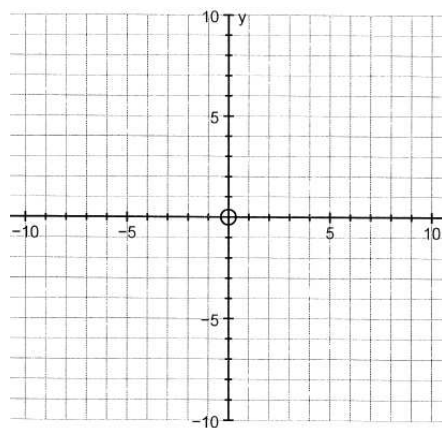
1. $y = 2x - 1$

x	$y = 2x - 1$	y	point
0			
1			
2			
3			
4			



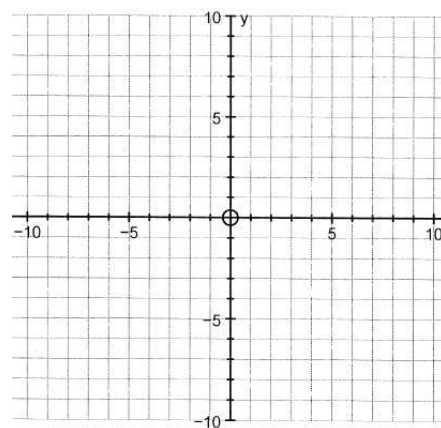
2. $y = 3x - 2$

x	$y = 3x - 2$	y	point
0			
1			
2			
3			
4			



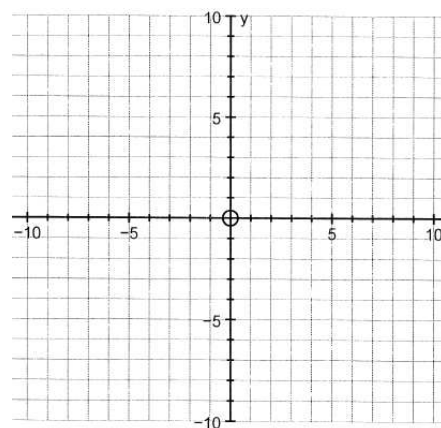
3. $y = \frac{x}{2} + 2$ (hint: $\frac{x}{2}$ means $x \div 2$)

x	$y = \frac{x}{2} + 2$	y	point
0			
1			
2			
3			
4			



4. $y = -2x + 3$ (watch out for the negative gradient)

x	$y = -2x + 3$	y	point
0			
1			
2			
3			
4			



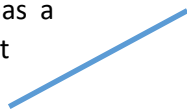
6. I am able to understand the gradient of a line

Key ideas:

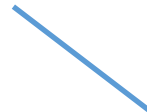
Gradient of a line is a number that tells us how steep it is. The steeper the line, the bigger the gradient.

Simplify the gradient fraction if you can. A gradient of $\frac{2}{1}$ would be written as 2, for example. It doesn't matter which two points on a line you use, as long as both are on the grid.

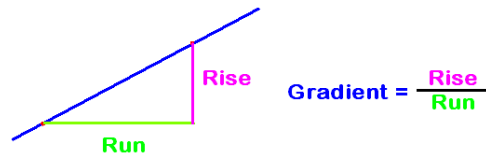
An 'uphill' line has a positive gradient



A 'downhill' line has a negative gradient

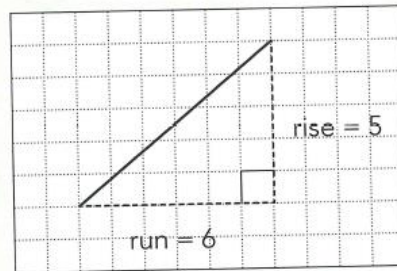


The gradient is calculated by dividing the rise by the run



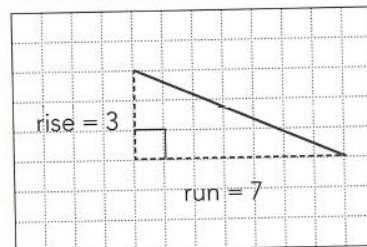
Example 1

$$\begin{aligned}\text{Gradient} &= \frac{\text{rise}}{\text{run}} \\ &= \frac{5}{6}\end{aligned}$$



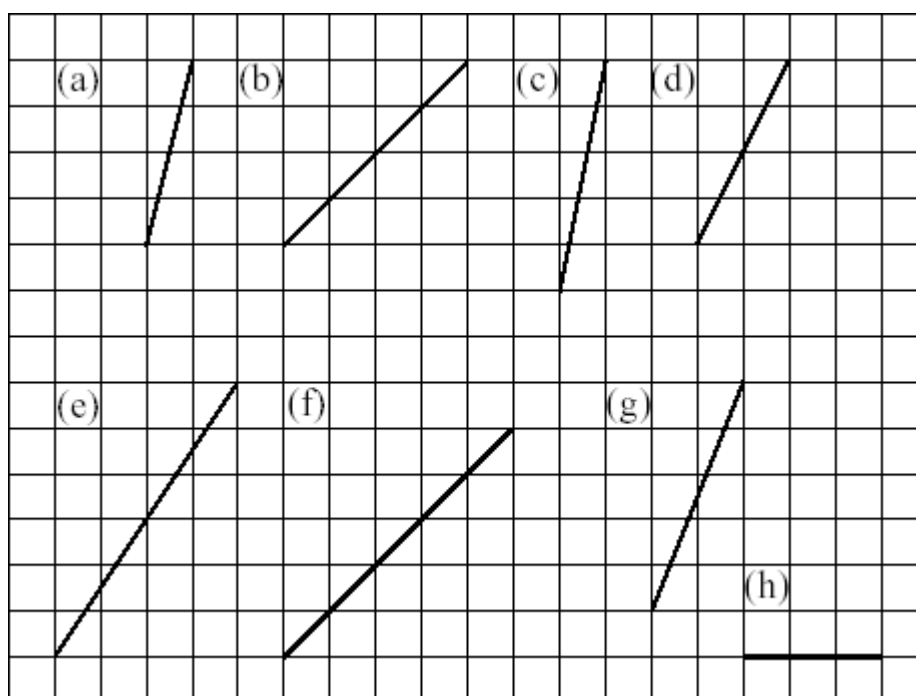
Example 2

$$\begin{aligned}\text{Gradient} &= -\frac{\text{rise}}{\text{run}} \\ &= -\frac{3}{7}\end{aligned}$$



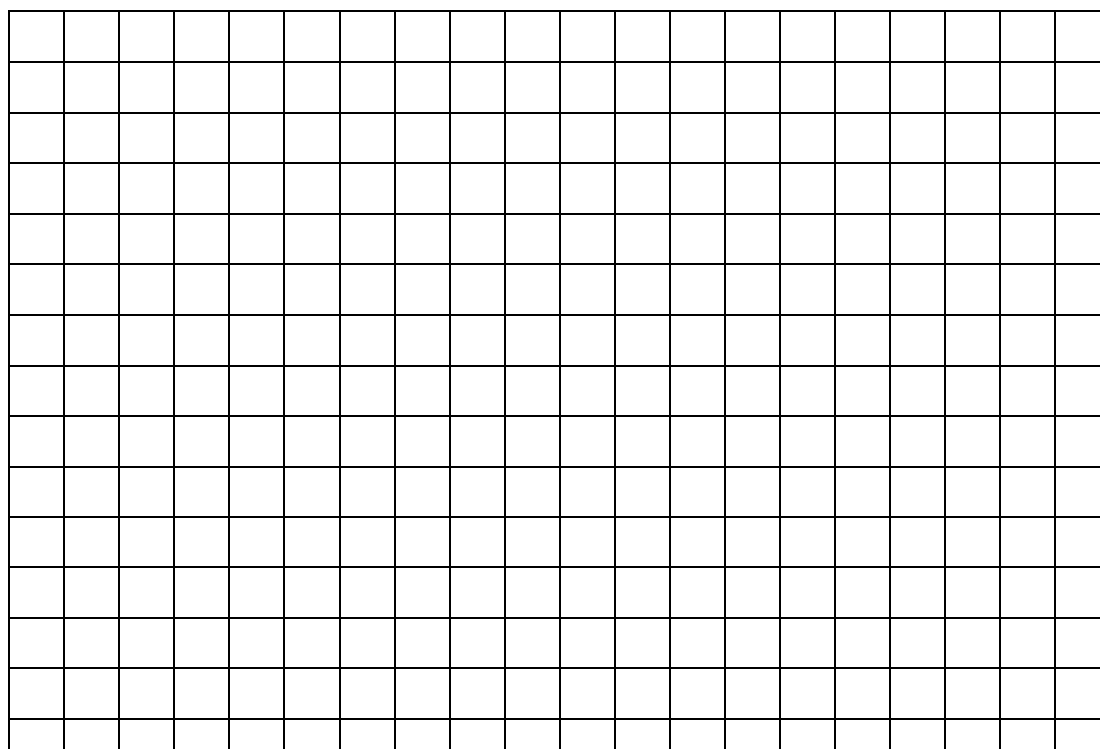
Exercise :

1) Find the gradient of each line.



2. Draw lines that have these gradients :

- a) 4 b) 1 c) $\frac{3}{4}$ d) $\frac{1}{2}$ g) $-\frac{4}{7}$ h) $-\frac{5}{3}$ i) - 2



7. I am able to draw a straight line using the gradient and intercept method

All linear equations can be written in the form :

$$y = mx + c$$

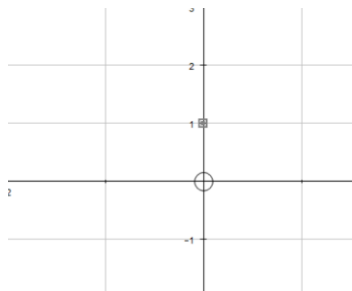
gradient ←
→ y intercept

Remember: gradient = $\frac{\text{rise}}{\text{run}}$

Example:

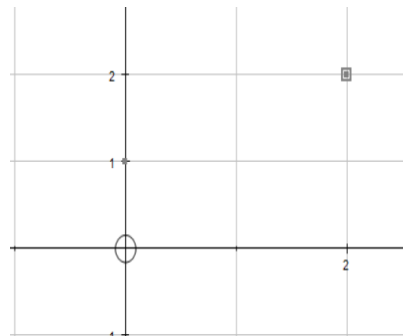
Draw the graph of $y = \frac{1}{2}x + 1$ $c = 1$ and $m = \frac{\text{rise}}{\text{run}} = \frac{1}{2}$

Step 1: Plot the y intercept 1

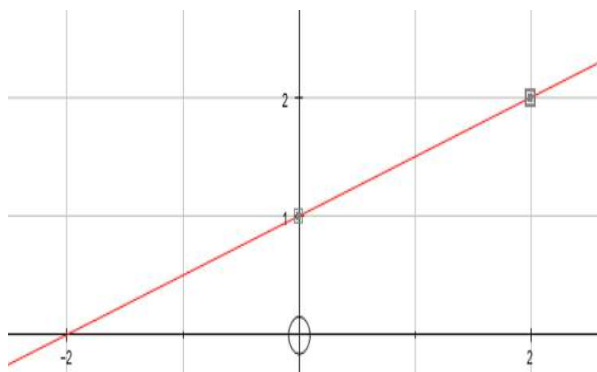


Step 2: From the y intercept plot the gradient:

1 up and 2 across



Step 3: Join the points




Remember : lines with a positive gradient slope up

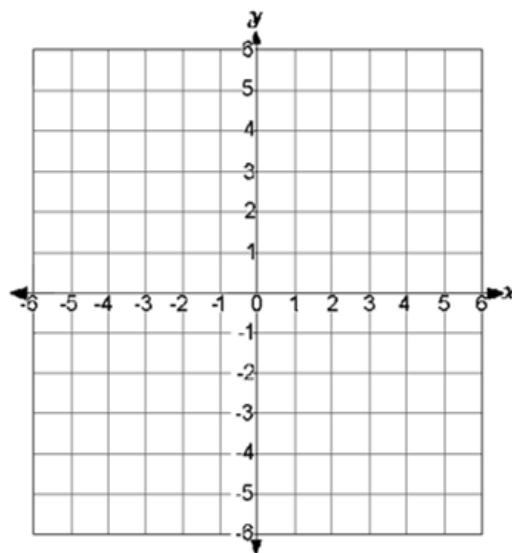
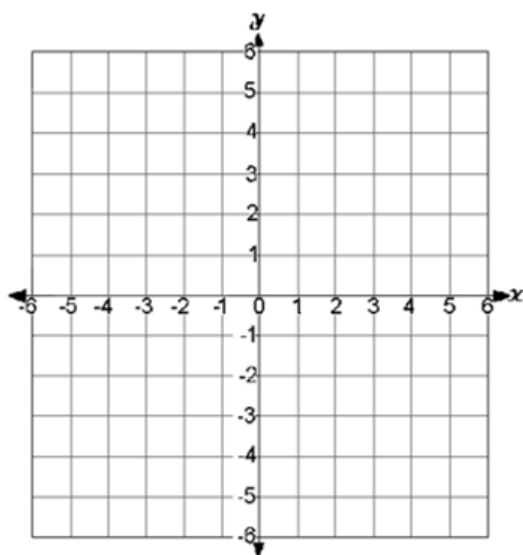
lines with a negative gradient slope down

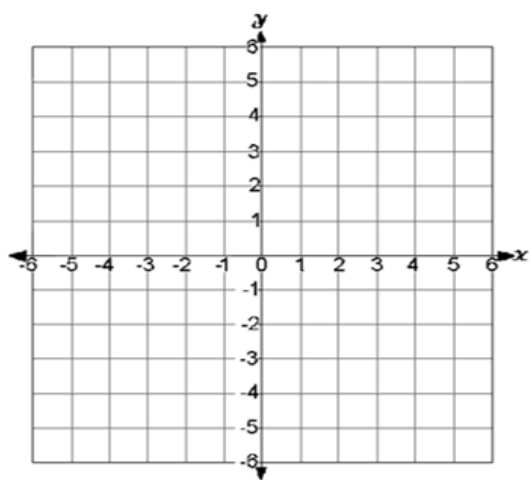
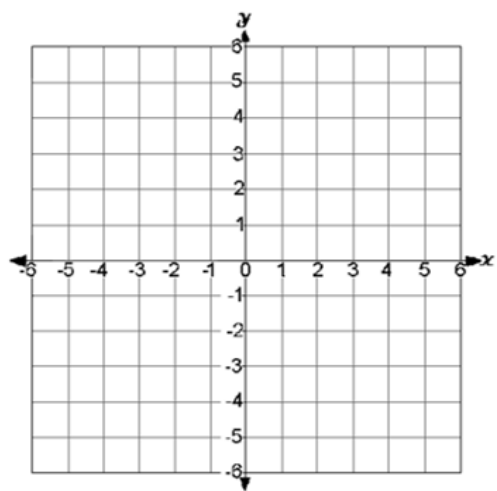
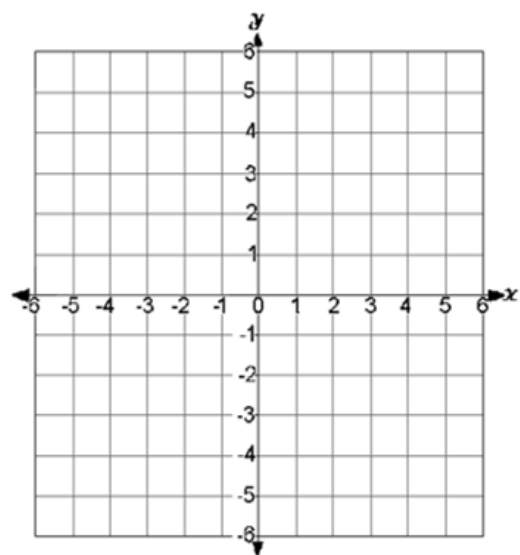
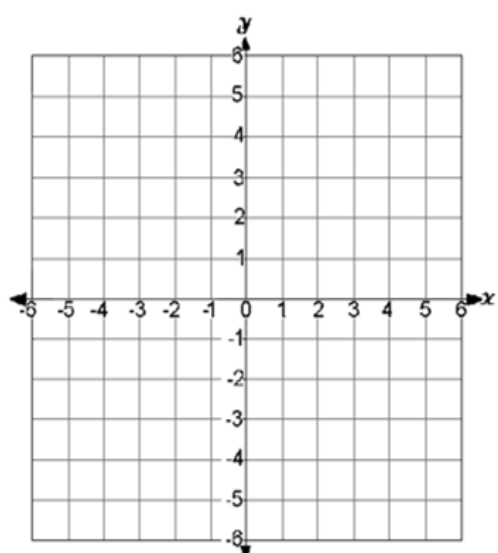
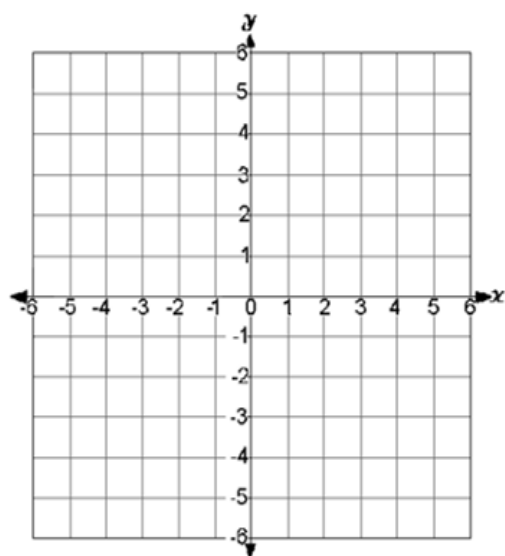
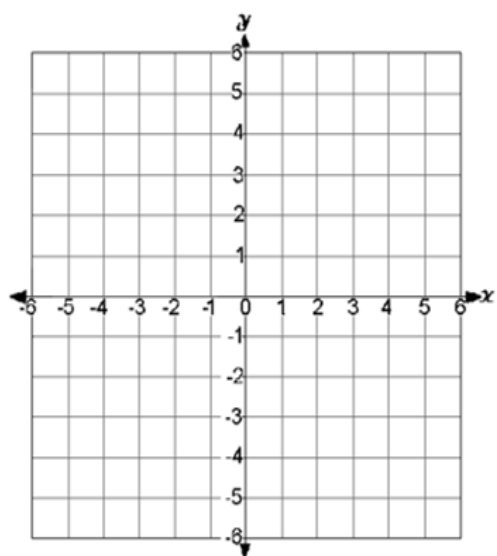
Exercise:

- A. State the gradient, y-intercept and direction of the line for each of the following equations. The first one is done for you.

Equation	Gradient	y-intercept	Line direction
1. $y = 3x + 2$	3	2	
2. $y = 5x - 4$			
3. $y = \frac{1}{4}x + 5$			
4. $y = 4 - 2x$			
5. $y = \frac{2}{5}x - 3$			
6. $y = x - 2$			
7. $y = 3x$			
8. $y = 3x + \frac{1}{2}$			

- B. Use the equations in section A and using the gradient-intercept method sketch the lines on the axes provided.





8. I am able to draw a straight line using x and y intercept

The y-intercept is where the graph crosses the y-axis. This is where $x = 0$.

The x-intercept is where the graph crosses the x-axis. This is where $y = 0$.

Example: Sketch $3x - 2y = 6$ by finding the x-intercept and y-intercept.

$$3x - 2y = 6$$

Find the y-intercept by substituting $x = 0$ into the equation

y-intercept ($x=0$)

$$3(0) - 2y = 6$$

$$-2y = 6$$

$$y = -3$$

y-intercept is $(0, -3)$

x-intercept ($y=0$)

Find the x-intercept by substituting $y = 0$ into the equation

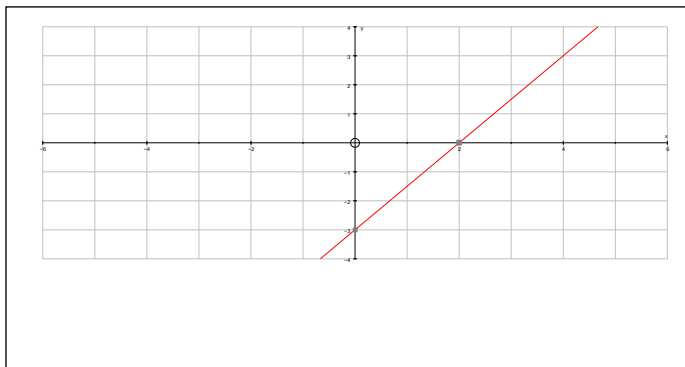
$$3x - 2(0) = 6$$

$$3x = 6$$

$$x = 2$$

x-intercept is $(2, 0)$

Mark the x-intercept and y-intercept. Draw a line through both intercepts and extending in both directions.



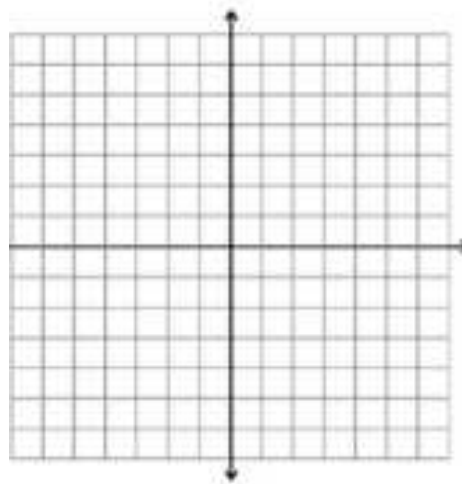
Exercise

Find the x-intercept and y-intercept for these linear relations and sketch each graph.

1. $2x + 3y = 12$

X intercept = _____

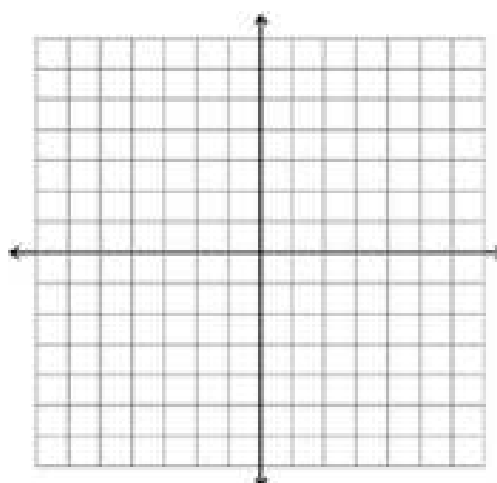
Y intercept = _____



2. $3x + y = 6$

X intercept = _____

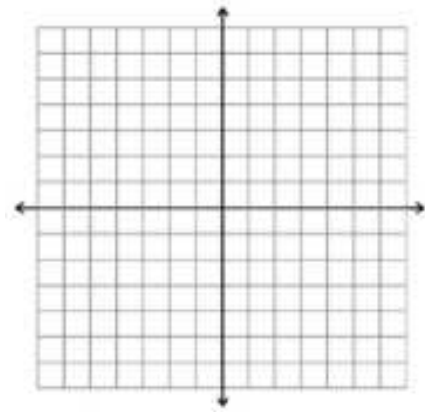
Y intercept = _____



3. $x - 4y = 4$

X intercept = _____

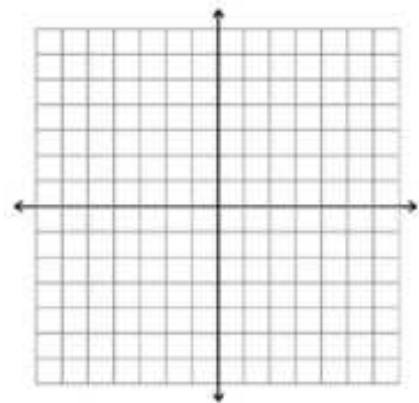
Y intercept = _____



4. $3x - 6y = 24$

X intercept = _____

Y intercept = _____



9. I am able to write the equation for a given graph – using 2 points.

To find the equation of a line I need **3** things

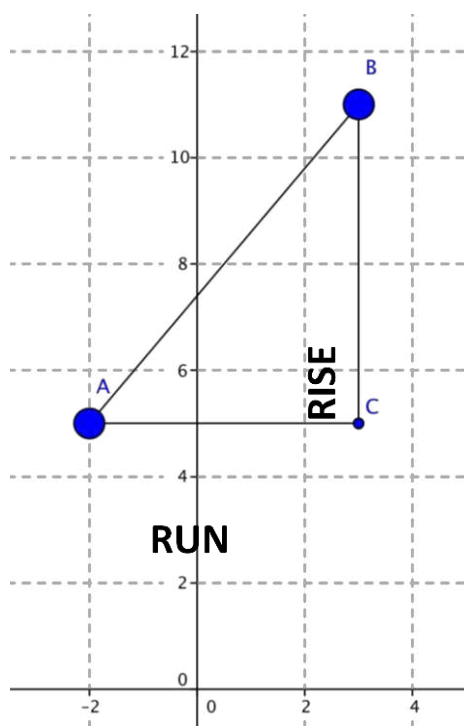
1. Point : (x_1, y_1)
2. Gradient: m
3. Formula: $y - y_1 = m(x - x_1)$

Steps:

1. Write down coordinates of the point. (x_1, y_1)
2. Find the gradient using the two points given
3. Put (x_1, y_1) and m in the formula $y - y_1 = m(x - x_1)$
4. You can also try to simplify the equation

Example:

Find the equation of the line that passes through A(-2,5) and B (3,11)



1. Point : (3,11)

2. Gradient:

I have to find the gradient:

- distance up is from 5 to 11 : **RISE** = 6
- distance across is from -2 to 3 : **RUN** = 5
- RISE over RUN is 6 over 5
or $6 \div 5 = 1.2$
The gradient is 1.2

3. Put (3,11) and 1.2 into the formula

$$y - 11 = 1.2(x - 3)$$

$$y = 1.2x - 3.6 + 11$$

$$y = 1.2x + 7.4$$

Calculate the equation of the line that joins the following pairs of points

1. (1, 5) and (3, 9)

1. (2, 8) and (4, 9)

1. (5, 1) and (9, 5)

1. (-2, 1) and (1, 7)

1. (0, 3) and (1, 1)

1. (8, -2) and (1, 5)

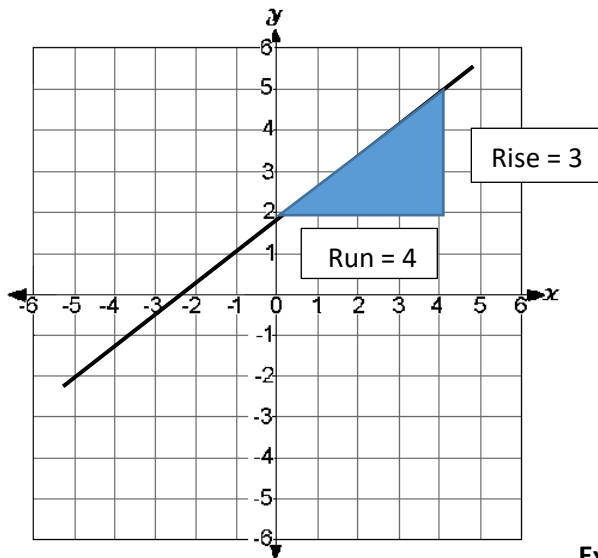
1. (-4, 3) and (6, -2)

1. (1, -7) and (-2, 5)

10.I am able to write the equation for a given graph using the gradient and intercept

- The **gradient-intercept** form of the equation of a straight line ($y = mx + c$) is the most useful form for writing down the equation of a line.
- For any line:
 - Locate the **y-intercept** (point where the graph is crossing the Y-axis) to evaluate **c**.
 - Calculate the **gradient, m** ie: work out $\frac{\text{rise}}{\text{run}}$.
 - The equation of the line is then written down by replacing **m** and **c** with their numerical values in the equation $y = mx + c$.

Example 1: Write down the equation of the line shown.



Gradient = $\frac{\text{Rise}}{\text{Run}} = \frac{3}{4}$; Y-intercept (c) = 2
 So equation is: $y = mx + c$

$$Y = \frac{3}{4}x + 2$$

Example 2:

A line has a gradient of 4 and passes through the y - axis at -7. What is the equation of the line?

Ans: $m = 4$ and $c = -7$, so equation is:

$$Y = mx + c \rightarrow y = 4x - 7$$

Exercise

1. Write the equations of the lines with the following gradients (m) and y – intercepts(c):

a). $m = 3$ and $c = 5$

b). $m = 1$ and $c = -4$

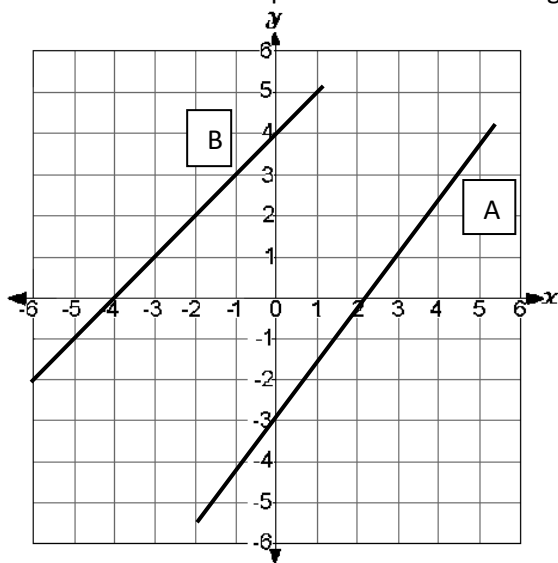
c). $m = -2$ and $c = -1$

d). $m = 10$ and $c = 50$

b). $m = -8$ and $c = 40$

c). $m = 15$ and $c = 200$

2. Write the equations of the following graphs:



Graph A:

$m =$ _____

$c =$ _____

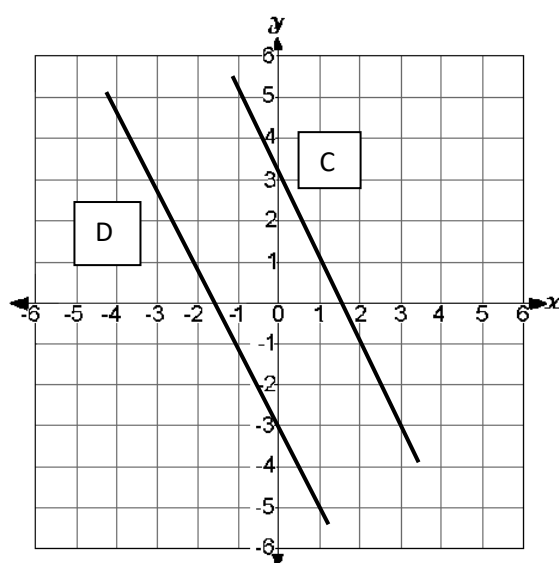
Equation: _____

Graph B:

$m =$ _____

$c =$ _____

Equation: _____



Graph C:

$m =$ _____

$c =$ _____

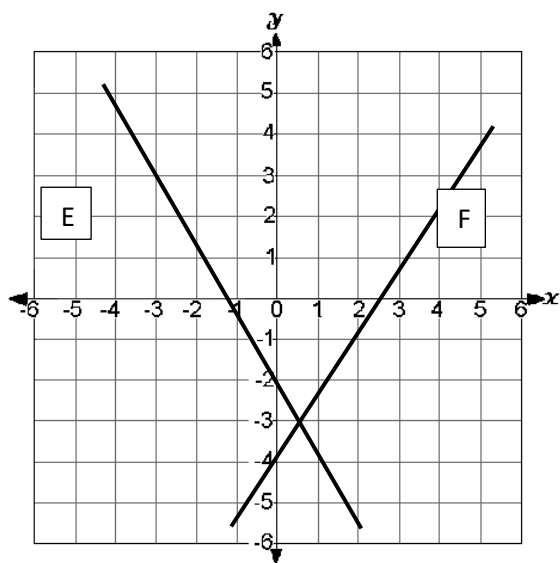
Equation: _____

Graph D:

$m =$ _____

$c =$ _____

Equation: _____



Graph E:

$m =$ _____

$c =$ _____

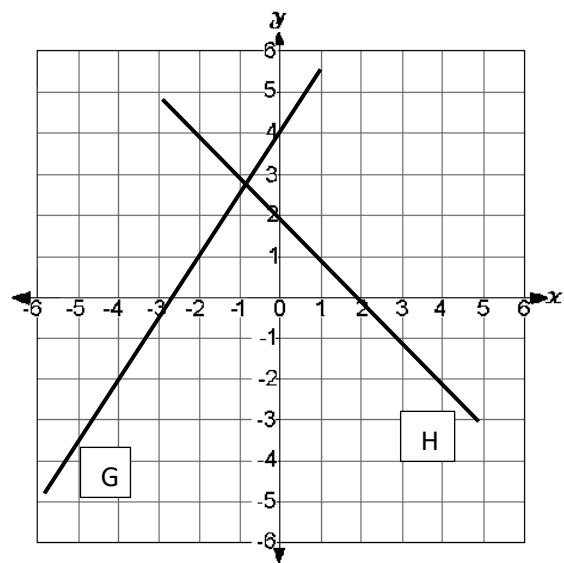
Equation: _____

Graph F:

$m =$ _____

$c =$ _____

Equation: _____



Graph G:

$m =$ _____

$c =$ _____

Equation: _____

Graph H:

$m =$ _____

$c =$ _____

Equation: _____

11. Application of Linear Graphs.

Many circumstances in nature and other situations can be described by straight-line relationships.

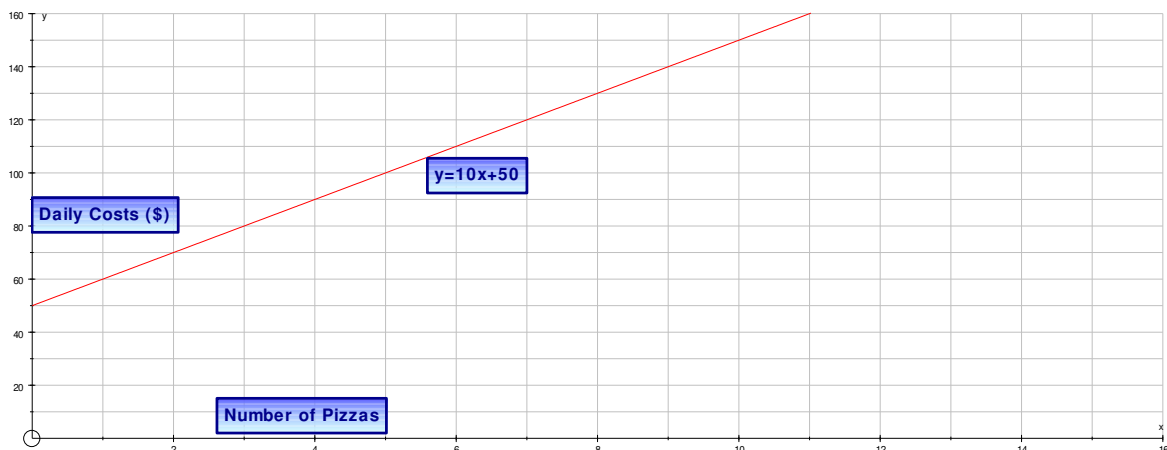
Example:

The Pizzeria Italiano specialises in selling large-size Quattro pizzas. The approximate relationship between x , the number of pizzas they sell daily, and y , their daily cost in dollars, is given by the equation: $y = 10x + 50$.

- Draw a graph showing the number of pizzas on the x -axis, and the daily costs on the y -axis. Use an appropriate scale.
- What are their costs if they sell eight pizzas?
- If their costs are \$100, how many pizzas did they sell?
- Give the y -intercept. What does it represent?
- Give the gradient. What does it represent?

Answer:

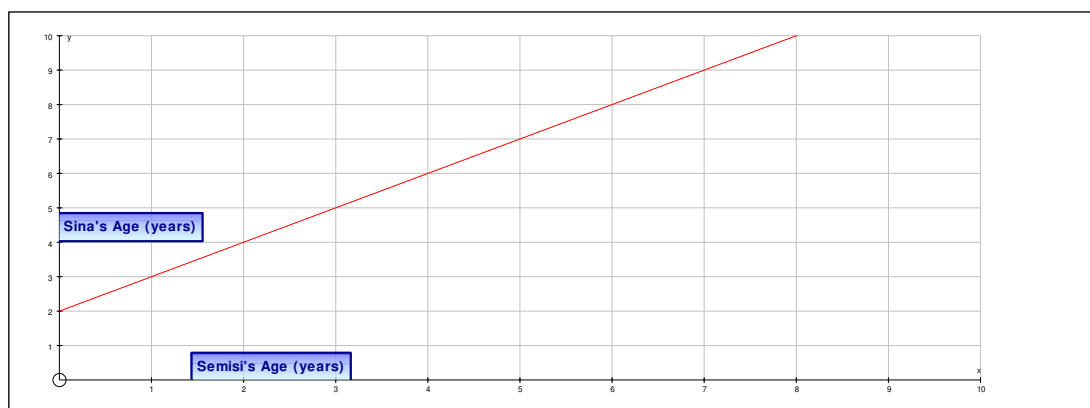
Graph 1:



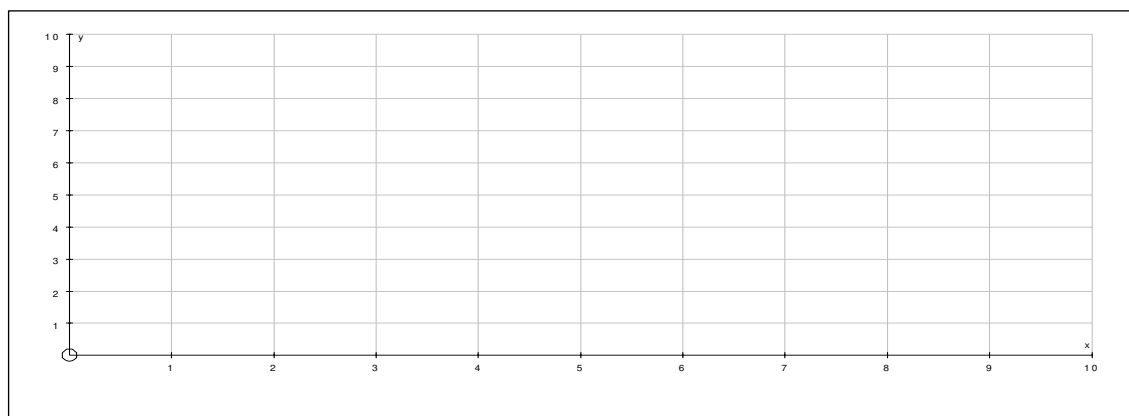
- Because the numbers are large a scale going up the y -axis in steps of 10 or 20 is best.
- Either read off the graph or substitute $x = 8$:
 $Y = 10 \times 8 + 50 = \$130$
- Either read off the graph or substitute $y = 100$:
 $100 = 10x + 50$
 $10x = 50$
 $X = 5$ pizzas
- The y -intercept is 50. This represents their fixed costs if they sold no pizzas.
- The gradient is 10. This represents the rate at which their costs change -
i.e. each extra pizza they make costs \$10.

Exercise:

1. Sina is 2 years older than her cousin, Semisi. Here is the graph of her age against Semisi's age.



- a. What is the gradient of the line _____
- b. What is the y – intercept _____
- c. Write down the equation of the line. _____
2. Planning regulations for a new cinema give the number of off – street car parks that the owners must provide. The rule can be written as an equation:
 $Y = \frac{1}{3}x + 5$, where x is the number of seats in the cinema, and y is the number of car-parks that must be provided.
- a. Sketch the graph of $y = \frac{1}{3}x + 5$.



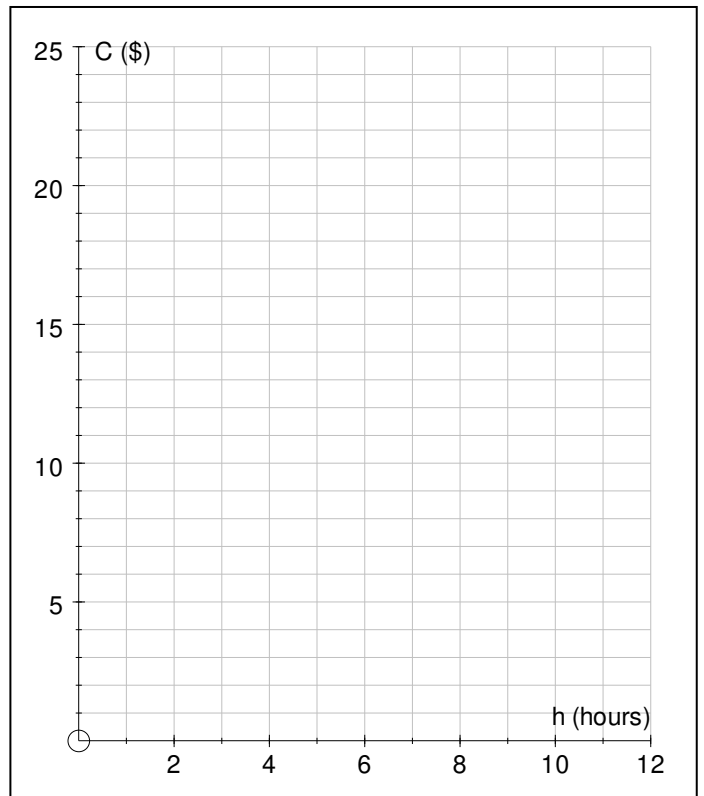
- b. How many car-parks must be provided if there are 60 seats _____
- c. Write down the gradient of the line $y = \frac{1}{3}x + 5$. _____
- d. Use the gradient to complete this sentence which explain the regulations in words:
“The cinema must provide five car-parks, and for every _____ seat(s) in the cinema there must be _____ additional car-park(s)”.

12.Practice Task

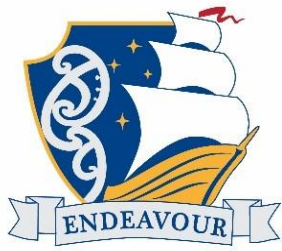
There are three Kayak hire companies in Auckland Harbour. They all round their charges up to the nearest hour. The charges are given in the table below.

Sione's Kayaks Fixed charge: \$7 Per Hour: \$2	Ocean Kayaks $C = 0.5h + 16$ Where c is the cost in dollars and h is the time in hours	Auckland Kayak Hire \$21 flat fee for the whole day
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Represent the Kayak hire companies' charges in the same way – i.e three graphs or three equations
 Chase wants to hire a Kayak for 7 hours. Recommend which Kayak hire company he should use



Sione wants to be the cheapest Kayak hire company, regardless of how long someone wants to hire the Kayak for. Describe at least two different ways Sione could realistically change his hire charges to achieve this.



JAMES COOK
HIGH SCHOOL

Year 11 English

Level 1 NCEA



“Creative Writing” task:

This assessment activity requires you to develop a piece of creative writing, which focuses on the personal experiences of one character.

You will be assessed on your ability to effectively develop and structure your ideas, and use language features to command attention appropriate to the audience and purpose for writing.

Task

- Write a short story of at least 350 words.
- Your audience is the other students in your class and your teacher.
- Plan and draft your writing
- Writers often use ideas, events, or people around them as inspiration for their work, incorporating details from their own personal experiences, reading, or observations into their own writing. In this activity you will follow a similar process.
- Choose a starter like a news item, a text you have studied in class, or an event from your own experiences.
- Once you have your started choose a character in that starter and tell the story from their point of view.

An example to help you:

Here is an extract from a news item about the earthquake in Canterbury on 4 September 2010.

A magnitude 7.1 earthquake struck about 30 km west of Christchurch at 4.35 am on Saturday, leaving extensive damage in the city. Emergency services have been inundated with calls for help following the quake which had a depth of 10 km. Police said power to Christchurch was out and sewer lines had been damaged, and that part of Avonside Drive had been damaged and could not be driven on. A man who lives in the southern Christchurch suburb of Southshore described the quake as "incredibly long and tortuous". He was on the second floor of his house and could feel the house "twisting and fracturing around our ears", and it had been left on an odd angle.

Now read this extract from a piece of creative writing based on the same incident. Note how it tells the same event from a more up close and personal perspective, focusing on one character.

All Shook Up

Alex was asleep upstairs in his 100-year-old villa when the earthquake struck. He was awakened instantly by a sound like a 747 landing in his garden. Then he felt the shaking – violent shaking that threw him out of his bed. He realized that it was an earthquake and so he slid under his bed to avoid any falling debris. For Alex, the shaking and the deafening noise seemed to go on forever. He was forced to stay under the bed while bits of plaster and wood fell all around him. He could hear the cracking of wood and smashing of glass as his house seemed to be twisted and pulled in different directions.

When the shaking stopped, he slipped cautiously out from under the bed and looked around in the darkness. No light except from the setting moon. Even in the gloom he could see that his house and his possessions had been utterly demolished. He started trembling, realising that he was lucky to be alive. The chimney had collapsed and bricks lay strewn across the floor. Every picture had fallen off the wall and the floor – or what was left of it – was covered in thousands of deadly shards of razor-sharp glass. Alex realised that he could not get out of his bedroom. The floorboards had been twisted and snapped and he stood staring into a vast hole where the upstairs hallway used to be. He was trapped on a creaking and very dangerous island. He carefully brushed some rubble from his bed and sat down to wait for rescue.

You will need to make sure that the writing you submit for assessment:

- ✓ is at least 350 words long
- ✓ develops and structures your ideas
- ✓ uses language features that are appropriate to your audience and purpose
- ✓ has been checked for errors.

Protect yourself and others from COVID-19



Wash your hands with soap and water often (for at least 20 seconds). Then dry.



Cough or sneeze into your elbow or by covering your mouth and nose with tissues.



Clean and disinfect frequently touched surfaces and objects, such as doorknobs.



Don't touch your eyes, nose or mouth if your hands are not clean.



Put used tissues in the bin or a bag immediately.



Stay home if you feel unwell.

For updates and more information on keeping yourself safe, visit [Covid19.govt.nz](https://www.covid19.govt.nz)

New Zealand Government

Unite
against
COVID-19