Drawing straight-line graphs and finding their

slope

Year 11 General Maths Units 1 and 2



# **Learning Objectives**

By the end of the lesson I hope that you understand and can apply the following to a range of questions from the Unit 1 and 2 General Mathematics course.

- To be able to draw a straight-line graph.
- To be able to find the slope of a straight line.



Examples have been extracted, with permission, from the Cambridge General Mathematics Units 1 and 2 Textbook

### Recap

In the previous lessons we have been recapping a lot of the algebra work we have done in previous years. This is a pretty massive part of the course and so we have to make sure it is understood.

But have we ever really wondered what an equation such as 3x + 4 means?

Well, let's use **desmos.com** to have a look.





Examples have been extracted, with permission, from the Cambridge General Mathematics Units 1 and 2 Textbook

## A straight line?

Yup. A straight line.

But there is lots of Maths we can do with a straight line. But there are two important things we need to be able to find:

- Gradients
- y-axis intercept



Where a straight line cuts the y-axis is called the intercept.



# Lots of ways of writing a straight line

There are lots of ways we can try and trick you and "disguise" a straight line. Some examples are shown.

The key is to ensure there is only one letter and that it doesn't have a floaty number.

$$y = 3x + 7 \qquad y = 7 + 3x$$

$$y = 4 - 2x \qquad y = 7 + 3x$$

$$y = 6x + 0$$

$$y = 7$$

$$x = -3$$

$$y + 4 = 2x \qquad y = -4 + 2x$$

$$\frac{y - 3}{2} = x$$



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## Plotting the points on a straight line graph

It is very unlikely that we are going to allow you to use desmos.com in an exam. And, if we do, you're not going to be able to print out the graphs and stick them into your exams.

So you are going to need to learn how to plot a straight line graph.

There are three steps to this:

- 1. Create a table of values
- 2. Create a set of axes
- 3. Plot the points





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# Example: Plotting the points on a straight line graph

Plot the graph of y = 1 + 2x by forming a table of values of y, using x = 0, 1, 2, 3, 4.



$$y = (+2x)$$





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## **Example: Plotting the points on a straight line graph**

Plot the graph of y = 8 - 2x by forming a table of values of y, using x = 0, 1, 2, 3, 4.



y = 8 - 2x





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## **Using the CAS**

As this is a CAS course, it's great that we can use the CAS to draw a straight line (or any) graph.

Let's use the CAS to draw the line y = 8 - 2x





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### Using the CAS to change how much we see

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### Using the CAS to get a table of values

As this is a CAS course, it's great that we can use the CAS to draw a straight line (or any) graph.

Let's use the CAS to draw the line y = 8 - 2x

I did not know the CAS could do this!









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## Positive and negative slopes

Graphs can slope in one of three ways!

They can slope up (positive slope) The can slope down (negative slope) They can have no slope (zero slope)

Note: There is one other type of slope which is where a line is vertical and we say it has an **undefined** slope.







# **Examples of positive and negative slopes**



# Slopes which are the same

We describe slopes in another way: having a gradient. Again, gradients are positive, negative, zero or undefined.

Whenever you see the word gradient, just think of the slope.



These lines have the same slope, but cross as different places on the y-axis



# Slopes have a value

We can measure the slope using a simple formula:

 $gradient = \frac{rise}{run}$ 

The bigger the number, the steeper the line.

This works for both positive and negative numbers.

Finding the gradient simply needs you to locate two points on the line (any two points) and the count squares!





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## Finding the gradient of a line

Find the slope of the line through the points (1, 4) and (4, 8).

When they give coordinates, it's a really good idea to sketch them on a graph. It makes it **much** easier to find the gradient.

Remember:

 $gradient = \frac{rise}{run}$ 







## Finding the gradient of a line

Find the slope of the line through the points (0, 10) and (4, 2).

When they give coordinates, it's a really good idea to sketch them on a graph. It makes it **much** easier to find the gradient.

Remember:







# Work to complete

The work I am asking to be completed for this topic is shown below.

This is the minimum work which should be completed. The more questions which are answered the better your chance of success in exams. Questions towards the end of the exercises and in the Chapter Review are the best practice you can do.

Questions to complete:

Exercise 5D: All questions

