



Gradient- intercept form

Year 9
Mathematics

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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 Year 9 Mathematics course.

- Know what the gradient-intercept form of a straight line is
- Be able to find the gradient and intercept from an equation
- Be able to write equations by reading the gradient and intercept from a straight line.
- Be able to rearrange linear equations

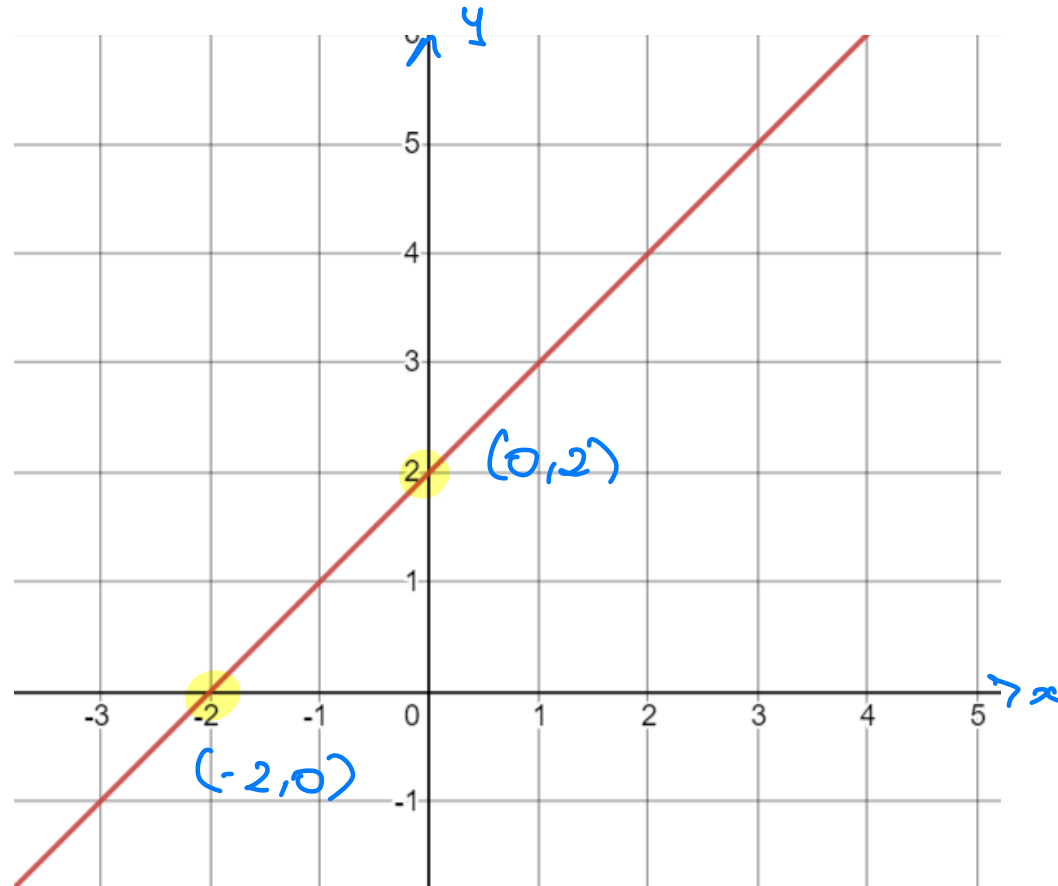


RECAP

We are powering through this section of the course. In previous lessons we have looked at how are can:

- Find x- and y-intercepts of straight lines
- Use intercepts to draw straight lines
- Draw horizontal lines
- Draw vertical lines
- Find the gradient of a range of straight lines

Now it is time to link them all together!



Parallel gradients

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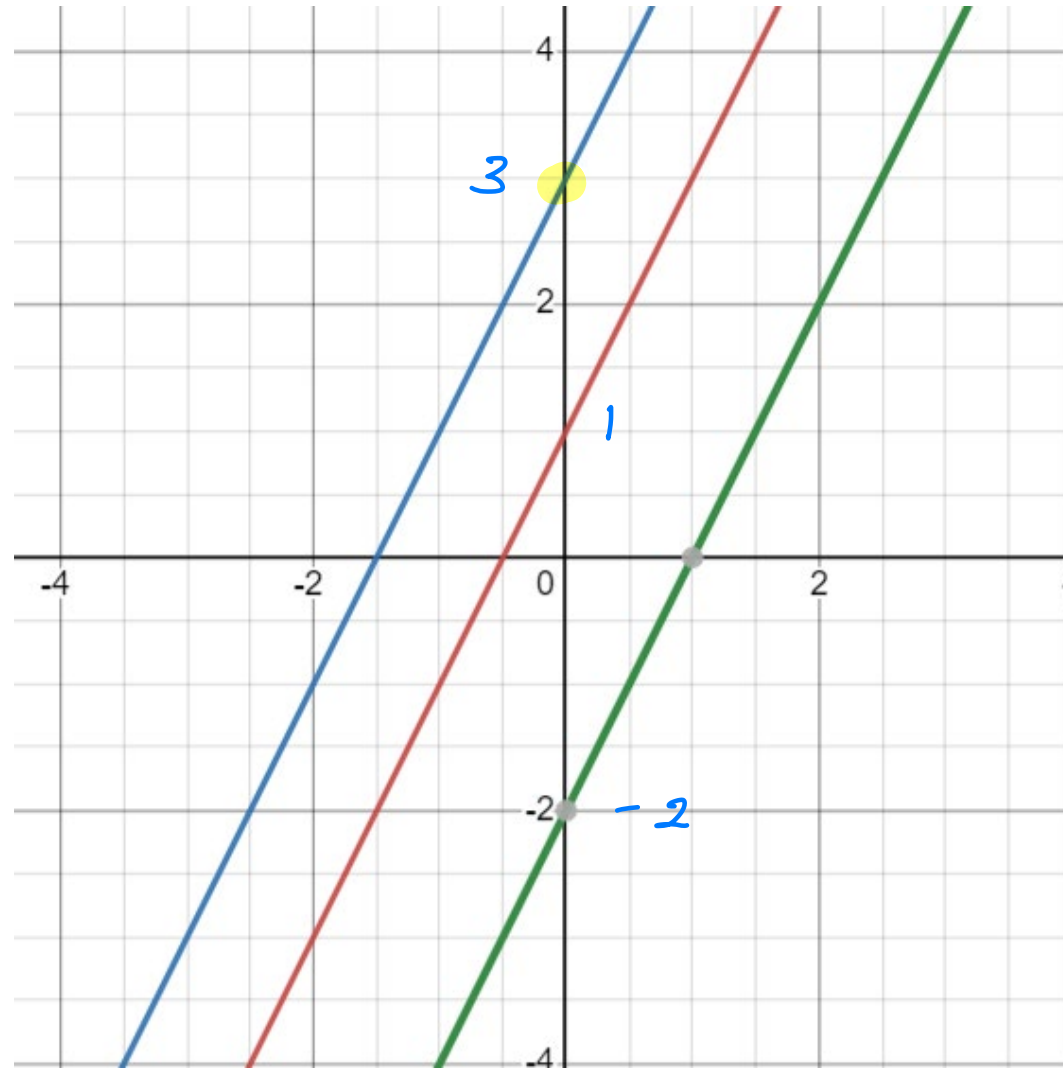
We know, from previous Maths topics, that the word parallel means two lines will never meet.




In this chapter it means that two lines which are parallel will **never meet**.

Examples of parallel lines are shown on the right (with their respective equations).

What do you notice about the equations?

What is different about the equations?



-  $y = 2x + 1$
-  $y = 2x + 3$
-  $y = 2x - 2$



Gradient-intercept form of an equation

The rest of the work in this chapter relates to the following **general equation**. This is the gradient-intercept form of a straight line.

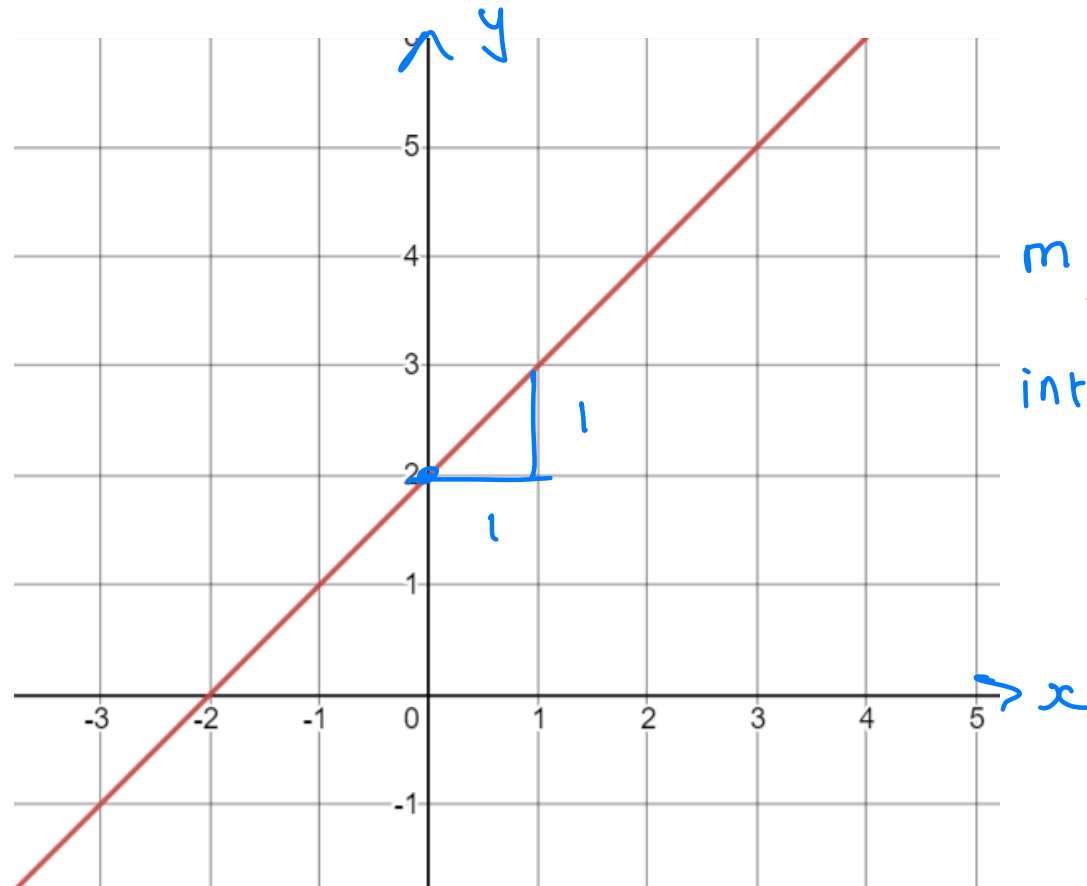
All straight lines can be written in the form:

$$y = mx + c$$

Where x and y are the letters shown on the x - and y -axes.
The m stands for the value of the gradient
The c stand for the y -axis intercept.

$$y = \text{ } x \text{ }$$

$$y = 1x + 2$$



Examples of gradient-intercept form

Here are some examples of lines written in gradient-intercept form.

Please note that they **all start with y=**.

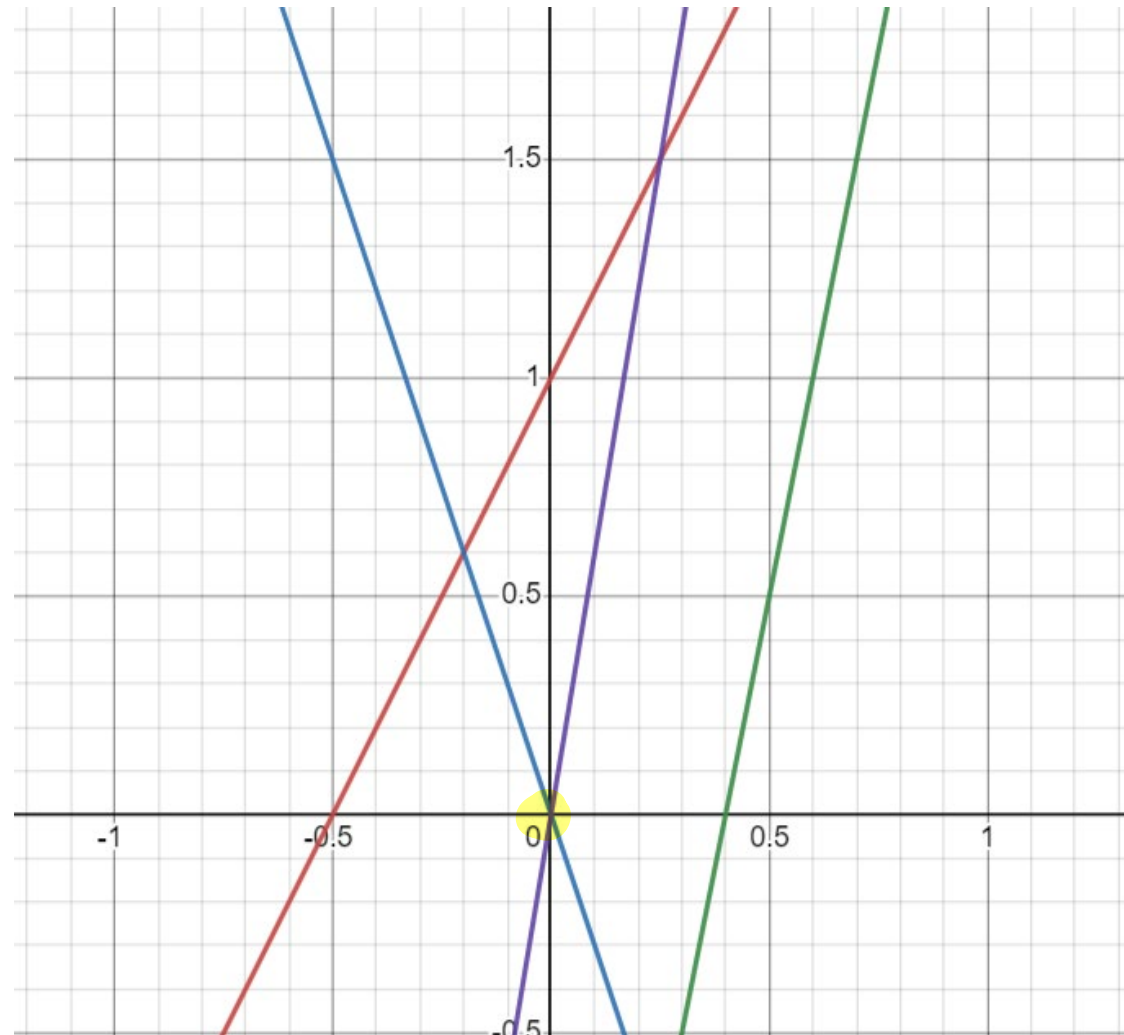
Writing the equation in a different way is one of the easiest ways to trick you!





$$y = 2x + 1$$

$$y = -3x$$

$$y = 5x - 2$$

$$y = 6x$$



- 1  $y = 2x + 1$
- 2  $y = -3x$
- 3  $y = 5x - 2$
- 4  $y = 6x$



Writing down the gradient and intercept from an equation

Given the following equations, write down the gradient and intercept:

$$y = 2x + 1$$

$$y = -3x$$

$$y = 5x - 2$$

$$y = 6x$$

$$y = \underline{\underline{mx + c}}$$

$$y =$$

$$y = 2x + 1$$

$$m = \underline{\underline{2}} \quad \text{int} : (0, 1)$$

$$y = 5x - 2$$

$$m = 5 \quad \text{int} (0, -2)$$

$$y = -3x$$

$$m = -3 \quad \text{int} : (0, 0)$$

$$y = 6x =$$

$$m = 6 \quad \text{int} (0, 0)$$



Trying to trick you!

Maths is all about the tricks.

Is the following line in gradient-intercept form?

$$4x + 2y = 10$$

Nope! This is **intercept form**.

We cannot read the gradient and intercept from this as it's in the wrong form. We have to transpose the equation to get the y on its own!

$$y = \underline{\underline{mx}} + c$$

$$4x + 2y = 10 \quad \div 2$$
$$\boxed{2x} + y = 5 \quad - 2x$$

$$y = 5 - 2x$$

$$y = \underline{\underline{-2x + 5}}$$

$$m = -2$$

$$\text{int} : (0, 5)$$



Converting from intercept form to gradient-intercept form

Transpose the following equation to turn it into gradient-intercept form:

$$x + 2y = 6$$

$$x + 2y = 6 \quad -x$$

$$2y = 6 - x$$

$$2y = -x + 6$$

$$y = \frac{-x}{2} + \frac{6}{2}$$

$$y = \underline{\underline{-\frac{1}{2}x + 3}}$$

y =

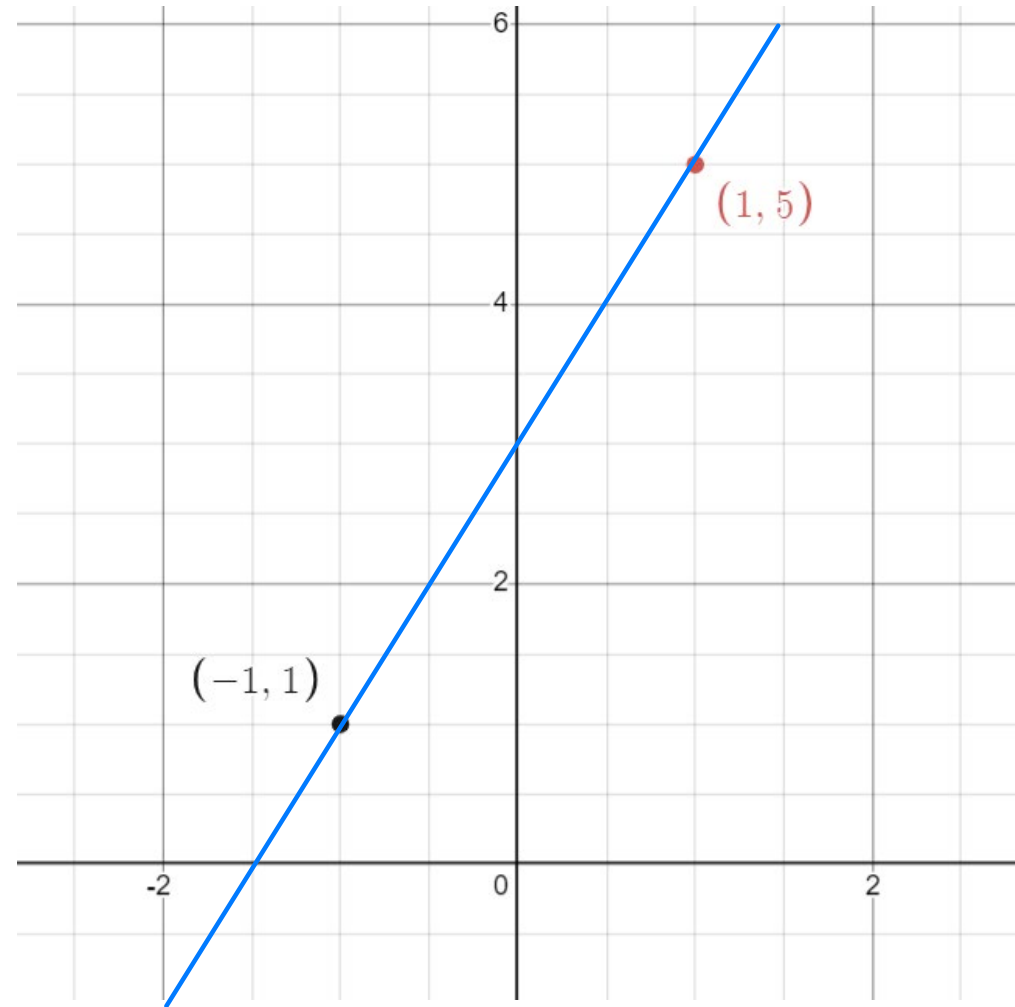


Coming soon

If I were to give you only two coordinates, could we find the equation of the straight line which would join them?

Without drawing them on a set of axes?

For example, $(-1, 1)$ and $(1, 5)$



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