

Equation of a Straight Line

Starter

1. (Review of last lesson)

Which of these straight lines are parallel? $y = 3x - 2$ $y = 4x - 2$ $y = 6 + 3x$

Working: $y = 3x - 2$ and $y = 6 + 3x$ because they have the same gradient of 3. Parallel lines have the same gradient i.e. the same coefficient of x when written as $y = mx + c$

2. How many points do we need to define a straight line?

Working: Two points — a third point can be used to check whether the first two are correct.

3. Find two points on each of the following lines:

(a) $y = 3x$

(b) $y = 2x + 5$

(c) $y = 9 - 4x$

Working: (a) For example, (0, 0) (1, 3) (2, 6) (−1, −3)

(b) For example, (0, 5) (1, 7) (2, 9) (−1, 3)

(c) For example, (0, 9) (1, 5) (2, 1) (−1, 13)

E.g. 1 Do Gradients 1-6 of **Geogebra 1: Draw the line given the equation**

Move the point A up and down the y – axis and point B around the grid until the line matches the given equation

Hint: Think what the values of m and c are.

Working: Click on 'Check Answer' to check your answers.

Geogebra 2: Draw the line given the equation

Better with a teacher — blue points need to be on certain values.

E.g. 2 State the gradient and y –intercept of these lines:

(a) $y = 4x + 7$

(b) $y = 9 - 2x$

(c) $3x + y = 8$

(d) $y - 5x + 11 = 0$

(e) $3y = x - 6$

(f) $5x - 4y = 12$

Hint: make sure the equation is in the form $y = mx + c$ — if not, you will need to rearrange the equation.

Working: (a) Gradient (coefficient of x) = 4
 y –intercept (constant term) = 7

(b) Gradient (coefficient of x) = −2
 y –intercept (constant term) = 9

(c) Rearrange $3x + y = 8$ to get y on its own: $y = 8 - 3x$
Gradient (coefficient of x) = −3
 y –intercept (constant term) = 8

(d) Rearrange $y - 5x + 11 = 0$ to get y on its own: $y = 5x - 11$
Gradient (coefficient of x) = 5
 y –intercept (constant term) = −11

(e) Rearrange $3y = x - 6$ to get y on its own ($\div 3$): $y = \frac{1}{3}x - 2$

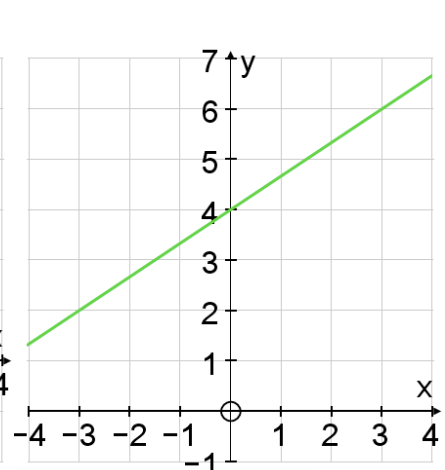
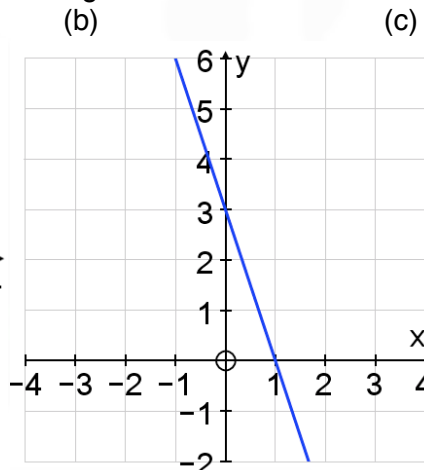
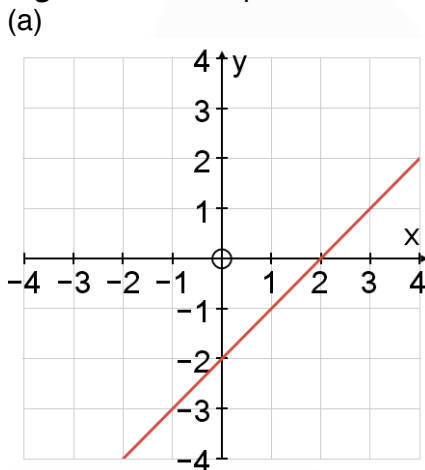
Gradient (coefficient of x) = $\frac{1}{3}$
 y -intercept (constant term) = -2

(f) Rearrange $5x - 4y = 12$ to get y on its own: $5x = 4y + 12$

$$\begin{aligned} 5x - 12 &= 4y \\ \frac{5}{4}x - 3 &= y \\ y &= \frac{5}{4}x - 3 \end{aligned}$$

Gradient (coefficient of x) = $\frac{5}{4}$
 y -intercept (constant term) = -3

E.g. 3 Find the equation of these straight lines.



Hint: when calculating the gradient, choose points whose coordinates are integers.

Working: (a) The y -intercept is $-2 \Rightarrow y = mx - 2$
 The gradient between the points $(0, -2)$ and $(2, 0)$ is 1 .
 The equation of the line is $y = x - 2$

(b) The y -intercept is $3 \Rightarrow y = mx + 3$
 The gradient between the points $(0, 3)$ and $(1, 0)$ is -3 .
 The equation of the line is $y = -3x + 3$.

(c) The y -intercept is $4 \Rightarrow y = mx + 4$
 The gradient between the points $(0, 4)$ and $(3, 6)$ is $\frac{2}{3}$.
 The equation of the line is $y = \frac{2}{3}x + 4$.

Video: [y = mx + c](#)

[Solutions to Starter and E.g.s](#)

Exercise

p48 Ex 14.4 Qu 4, 5, 6b, 7, 8

[Textbook answers \(only available during a lockdown\)](#)