



- 1** A straight line has equation $y = 3x - 2$

- Write down the gradient of the line.
- Write down the coordinates of the point where the line crosses the y-axis.

(2 marks)

In $y = mx + c$, m is the change in y for a 1-unit increase in x , called the gradient. c is the value of y when $x = 0$, called the y-intercept

The equation is in the form $y = mx + c$

a) The gradient is the coefficient of x , which is 3

b) The line crosses the y-axis where $x = 0$, so at $(0, -2)$

- 2** A straight line has equation $y = 5x + 2$

Write down the gradient of the line.

(1 mark)

The equation is in the form $y = mx + c$, where m is the gradient

Comparing $y = 5x + 2$ with $y = mx + c$ gives $m = 5$

The gradient is 5

Gradient measures change in y for each 1-unit increase in x . Here y increases by 5 whenever x increases by 1

5

- 3** A straight line has gradient 4 and passes through the point $(0, 5)$.

Find the equation of the line.

(2 marks)

A straight line has equation $y = mx + c$, where m is the gradient and c is the y-intercept

The gradient is 4 and the line crosses the y-axis at $(0, 5)$, so $c = 5$

The equation is $y = 4x + 5$

$y = 4x + 5$

4 Here are the equations of three straight lines.

Line A: $y = 2x + 1$

Line B: $y = 3x - 2$

Line C: $y = 2x - 5$

a. Which two lines are parallel?

b. Which line passes through the point $(0, -2)$?

(2 marks)

a) Parallel lines have equal gradients. Lines A and C both have gradient 2

b) At $(0, -2)$ the y-intercept is -2. Line B has y-intercept -2

5 A straight line has equation $y = 7 - 2x$

Write down the gradient of the line.

(1 mark)

Rewrite the equation as $y = -2x + 7$ so it matches the form $y = mx + c$

The coefficient of x is -2, so the gradient is -2

A common error is to answer 7, which is the y-intercept, not the gradient

-2

6 Here is a table of values for $y = 2x - 3$.

x	-1	0	1	2	3
y					

a. Complete the table of values.

b. Write down the gradient of the line.

(3 marks)

a)

$$x = -1: 2(-1) - 3 = -5$$

$$x = 0: -3$$

$$x = 1: -1$$

$$x = 2: 1$$

$$x = 3: 3$$

b)

Gradient = number in front of $x = 2$

-5, -3, -1, 1, 3; gradient 2

7 The equation of a straight line is $y = 4x - 1$.

For each point, say whether it lies on the line. Show your working.

a. (3, 11)

b. (2, 8)

(2 marks)

a)

$$x = 3: 4 \times 3 - 1 = 11$$

$$y = 11, \text{ so yes}$$

b)

$$x = 2: 4 \times 2 - 1 = 7$$

$$y = 8, \text{ not } 7, \text{ so no}$$

a) yes b) no

8 Here are the equations of four straight lines.

A: $y = 4x + 3$ B: $y = 3x - 7$ C: $y = -3x + 4$ D: $3y = x + 4$

Which line is parallel to $y = 3x + 4$?

(1 mark)

Parallel lines have the same gradient

$$y = 3x + 4 \text{ has gradient } 3$$

$$\text{B: } y = 3x - 7 \text{ has gradient } 3$$

B

9 A straight line has equation $2y = 6x + 10$

a. Write down the gradient of the line.

b. Write down the coordinates of the point where the line crosses the y -axis.

(2 marks)

Divide every term by 2 to get the equation in the form $y = mx + c$

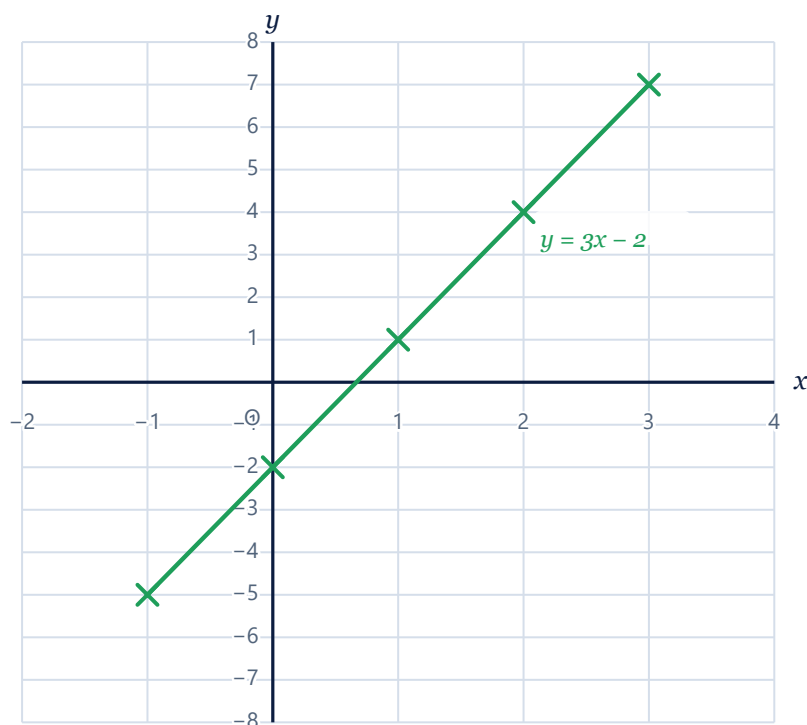
$$c: y = 3x + 5$$

The gradient is the coefficient of x , so the gradient is 3

The line crosses the y -axis where $x = 0$, giving $y = 5$, so the point is (0, 5)

10

On the grid, draw the graph of $y = 3x - 2$ for values of x from -1 to 3 .



(3 marks)

$$x = -1: y = -5$$

$$x = 0: y = -2$$

$$x = 1: y = 1$$

$$x = 2: y = 4$$

$$x = 3: y = 7$$

Plot and join with a ruler

Straight Line through $(-1, -5)$ and $(3, 7)$

- 11 A taxi company charges a fixed fee plus a cost for each kilometre travelled. The table shows the cost, in pounds, for some journeys. The points lie on a straight line graph.

Distance (km)	0	2	4	6
Cost (£)	3	7	11	15

- Work out the gradient of the line.
- What does the gradient represent?
- What does the y -intercept represent?

(3 marks)

a)

$$\begin{aligned}\text{Gradient} &= \{\text{change in cost}\} / \{\text{change in distance}\} \\ &= \{15 - 3\} / \{6 - 0\} = \frac{12}{6} = 2\end{aligned}$$

b)

£2 per km

c)

y -intercept = 3: fixed fee of £3

a) 2 b) £2 per km c) £3 fixed fee

- 12 The points $A(2, 3)$ and $B(6, k)$ lie on a straight line with gradient 2.

Work out the value of k .

(3 marks)

$$\text{Gradient} = \{k - 3\} / \{6 - 2\} = 2$$

$$\begin{array}{rcl} \times 4 & k - 3 & = 8 \quad \times 4 \\ +3 & k & = 11 \quad +3 \end{array}$$

$$k = 11$$

- 13 A straight line passes through the points $A(2, 5)$ and $B(6, 17)$.

Work out the gradient of the line.

(2 marks)

$$\begin{aligned}\text{Gradient} &= \text{change in } y \text{ divided by change in } x \\ \text{Change in } y &= 17 - 5 = 12. \text{ Change in } x = 6 - 2 = 4 \\ \text{Gradient} &= 12 \div 4 = 3\end{aligned}$$

$$3$$

- 14 A straight line has gradient 4 and passes through the point (1, 7).
Find the equation of the line.

(3 marks)

$$y = mx + c \text{ with } m = 4$$

$$y = 4x + c$$

$$7 = 4 \times 1 + c$$

$$7 = 4 + c$$

$$\begin{array}{rcl} -4 & & -4 \\ 3 & = & c \end{array}$$

$$y = 4x + 3$$

- 15 A straight line has gradient -2 and crosses the y -axis at (0, 5).
Work out the x -coordinate of the point where the line crosses the x -axis.

(3 marks)

$$y = -2x + 5$$

$$x\text{-axis: } y = 0$$

$$0 = -2x + 5$$

$$\begin{array}{rcl} +2x & & +2x \\ 2x & = & 5 \end{array}$$

$$\begin{array}{rcl} \div 2 & & \div 2 \\ x & = & 2.5 \end{array}$$

$$x = 2.5$$

- 16 Here is a table of values for $y = \frac{1}{2}x + 2$

x : -4, -2, 0, 2, 4

y : 0, ?, 2, ?, 4

- Work out the two missing values of y .
- Write down the gradient of the line.

(3 marks)

$$a) \text{ When } x = -2, y = -1 + 2 = 1$$

$$\text{When } x = 2, y = 1 + 2 = 3$$

$$b) \text{ The gradient is the coefficient of } x, \text{ which is } \frac{1}{2}$$

17 A straight line passes through the points $(0, -1)$ and $(4, 7)$.

a. Work out the gradient of the line.

b. Write down the equation of the line in the form $y = mx + c$

(3 marks)

a) Gradient = change in y over change in $x = \frac{7 - (-1)}{4 - 0} = \frac{8}{4} = 2$

b) The line crosses the y -axis at $(0, -1)$, so $c = -1$

The equation is $y = 2x - 1$

18 The straight line $y = 4x + c$ passes through the point $(3, 10)$.

a. Find the value of c .

b. Write down the coordinates of the point where the line crosses the y -axis.

(3 marks)

a) Substitute $x = 3$ and $y = 10$: $10 = 4(3) + c$

$$10 = 12 + c, \text{ so } c = -2$$

b) The y -intercept is c , so the line crosses the y -axis at $(0, -2)$