

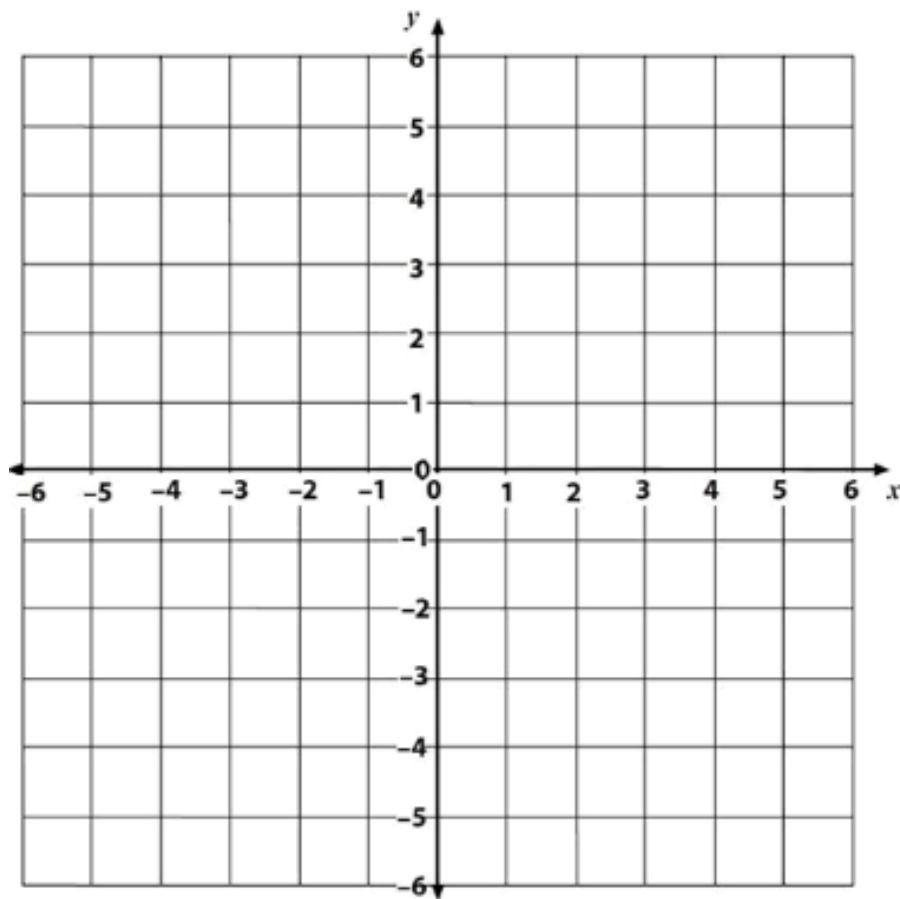
STRAIGHT LINE GRAPHS

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Worked example

Plot the coordinates:

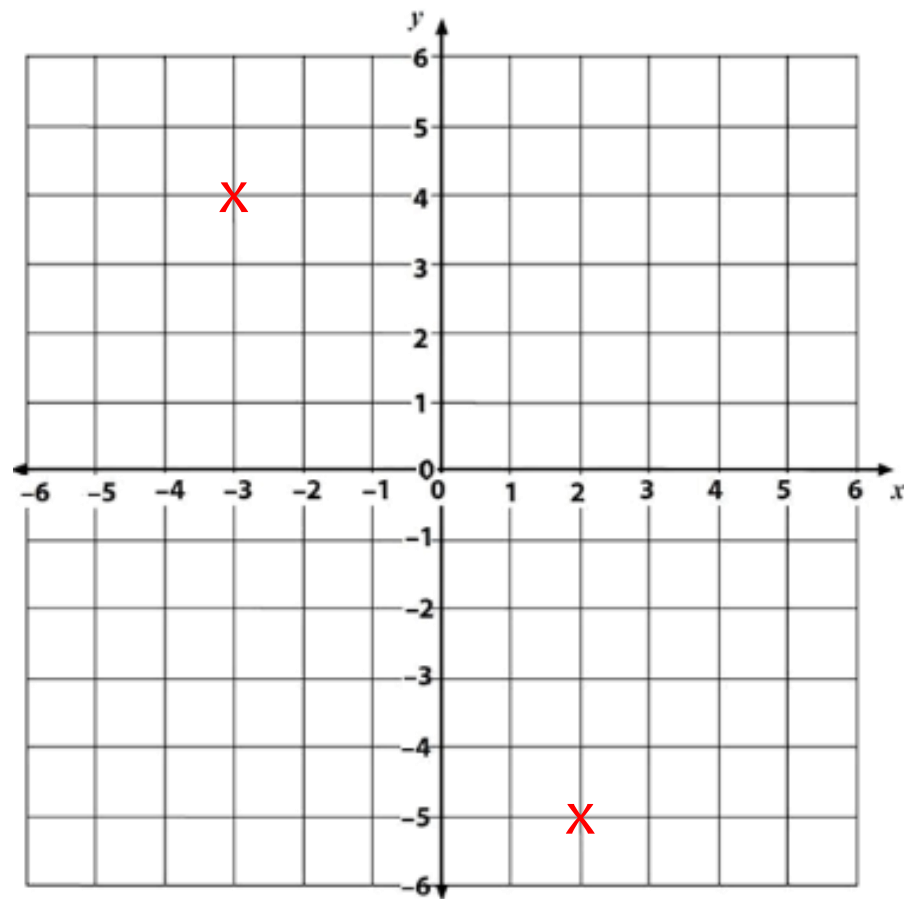
$(2, 5)$ $(-2, 5)$ $(-2, -5)$



Your turn

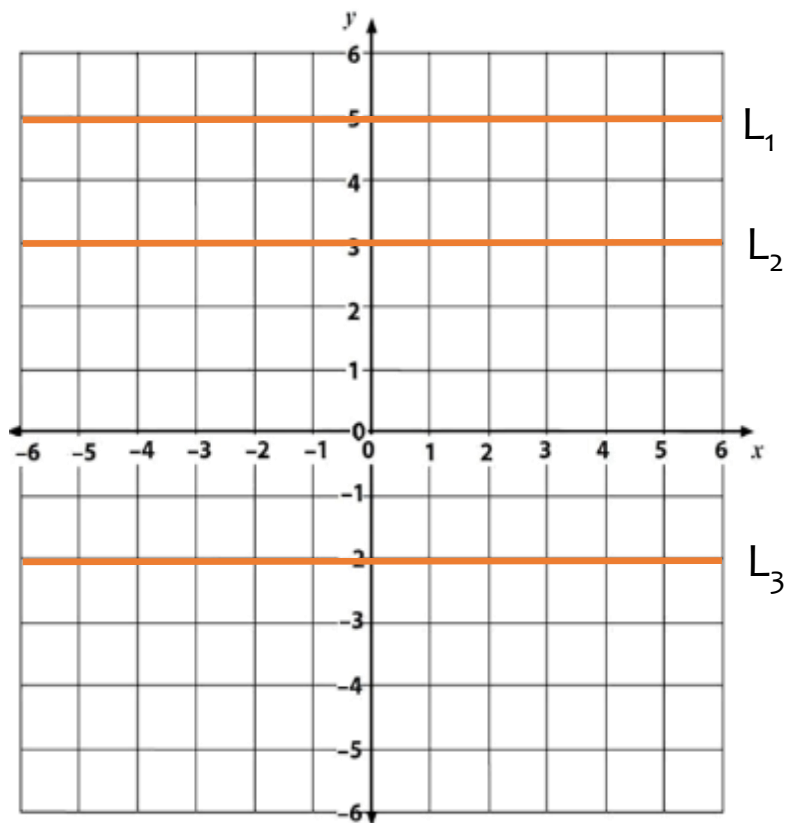
Plot the coordinates:

$(2, -5)$ and $(-3, 4)$



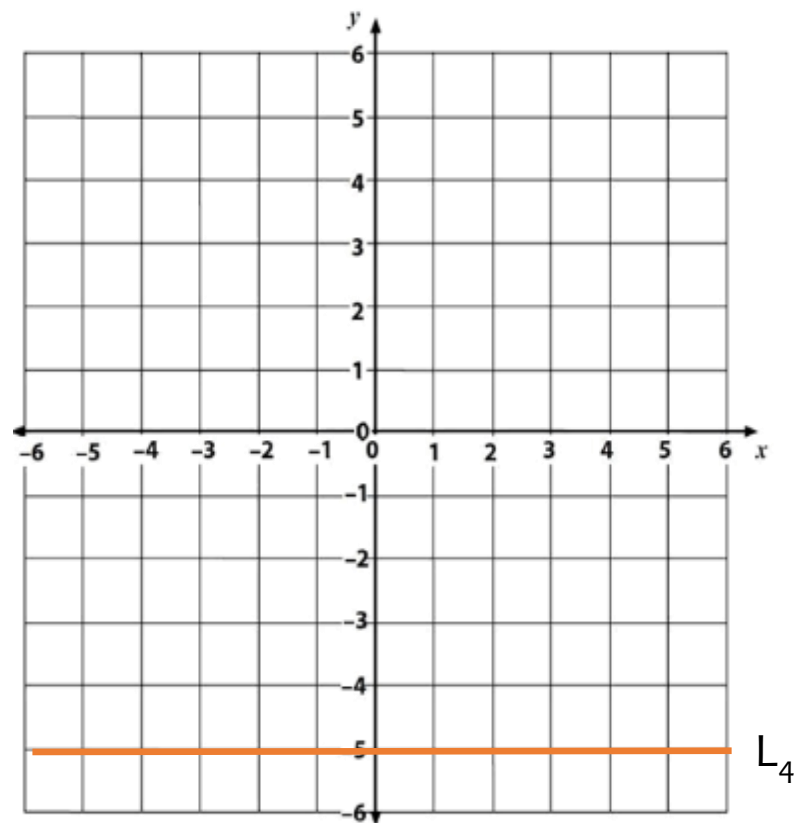
Worked example

Find the equation of the lines:



Your turn

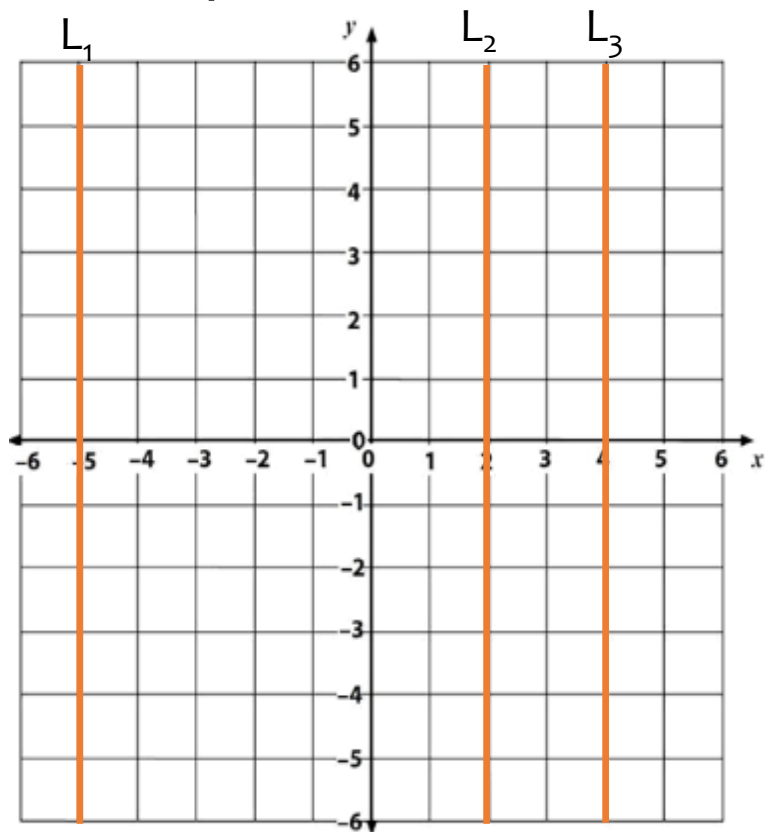
Find the equation of the line:



$$y = -5$$

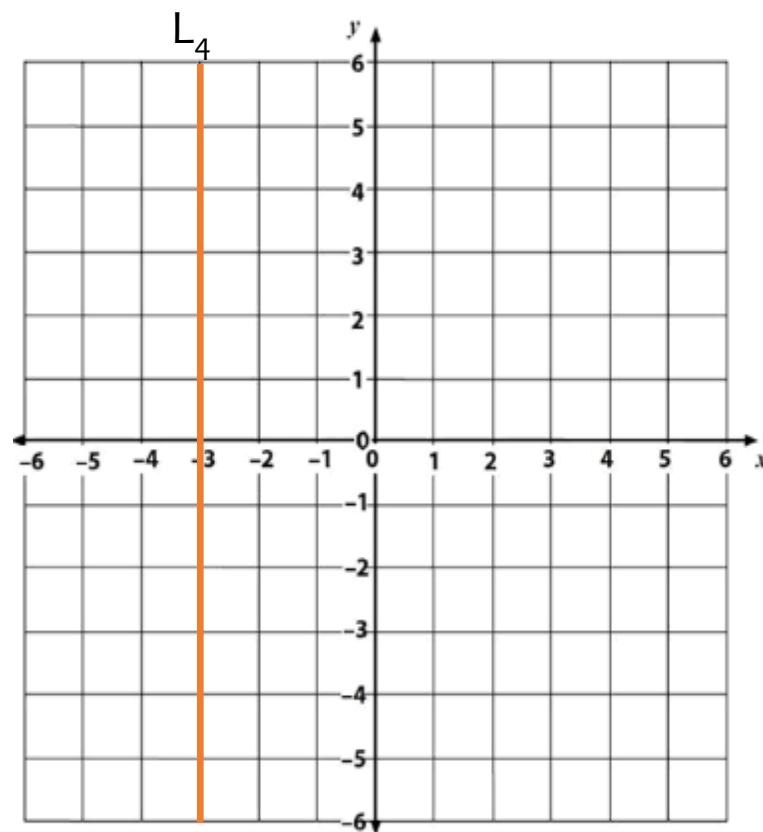
Worked example

Find the equation of the lines:



Your turn

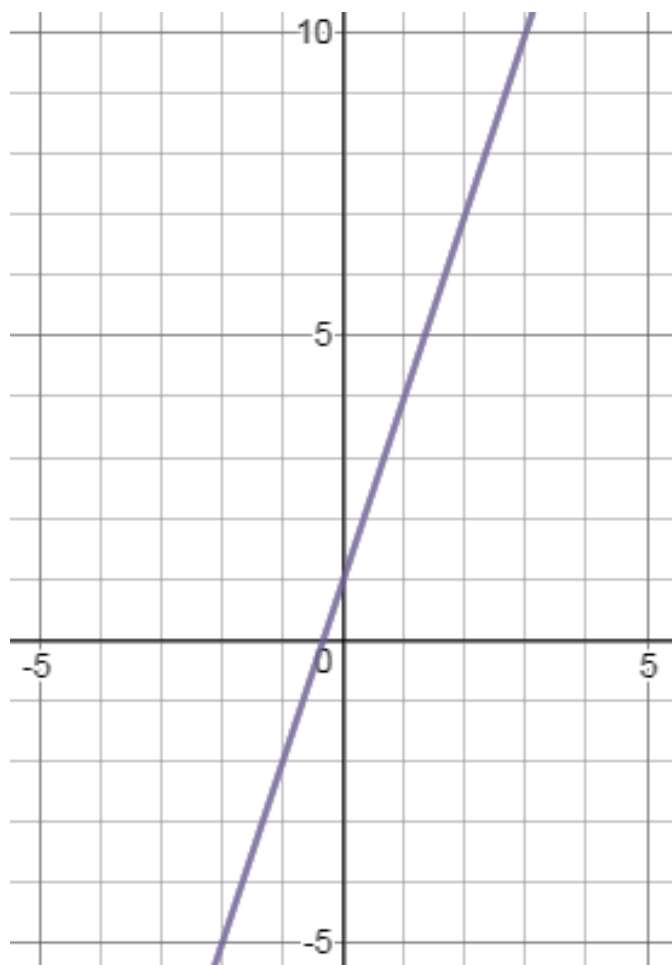
Find the equation of the line:



$$x = -3$$

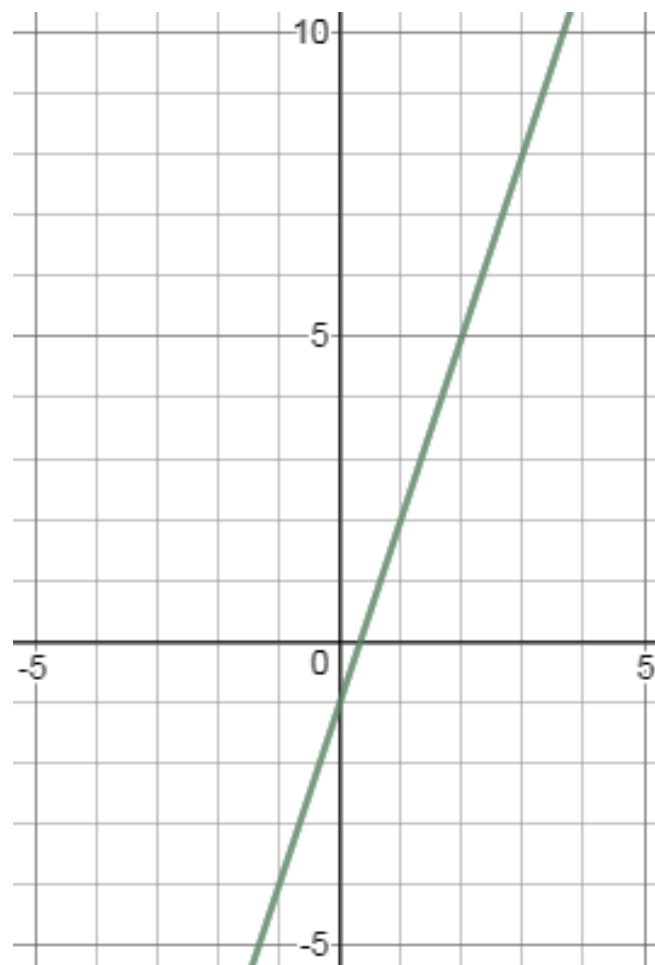
Worked example

Find the equation of the line:



Your turn

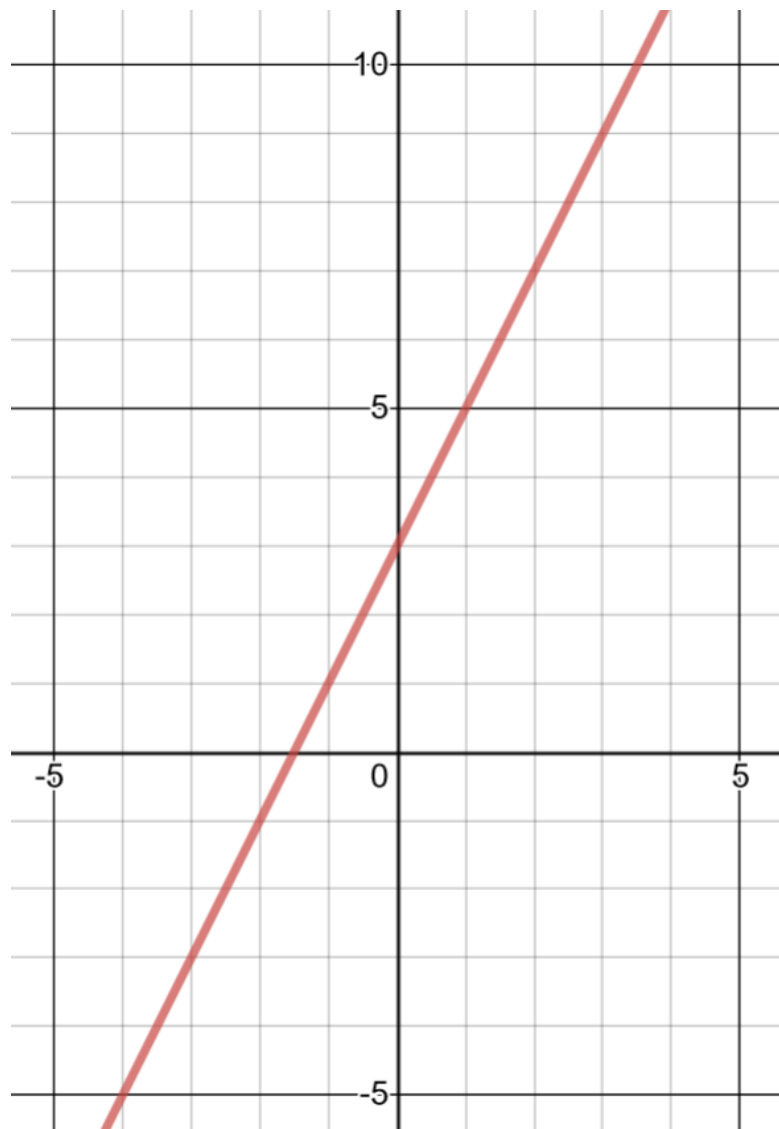
Find the equation of the line:



$$y = 3x - 1$$

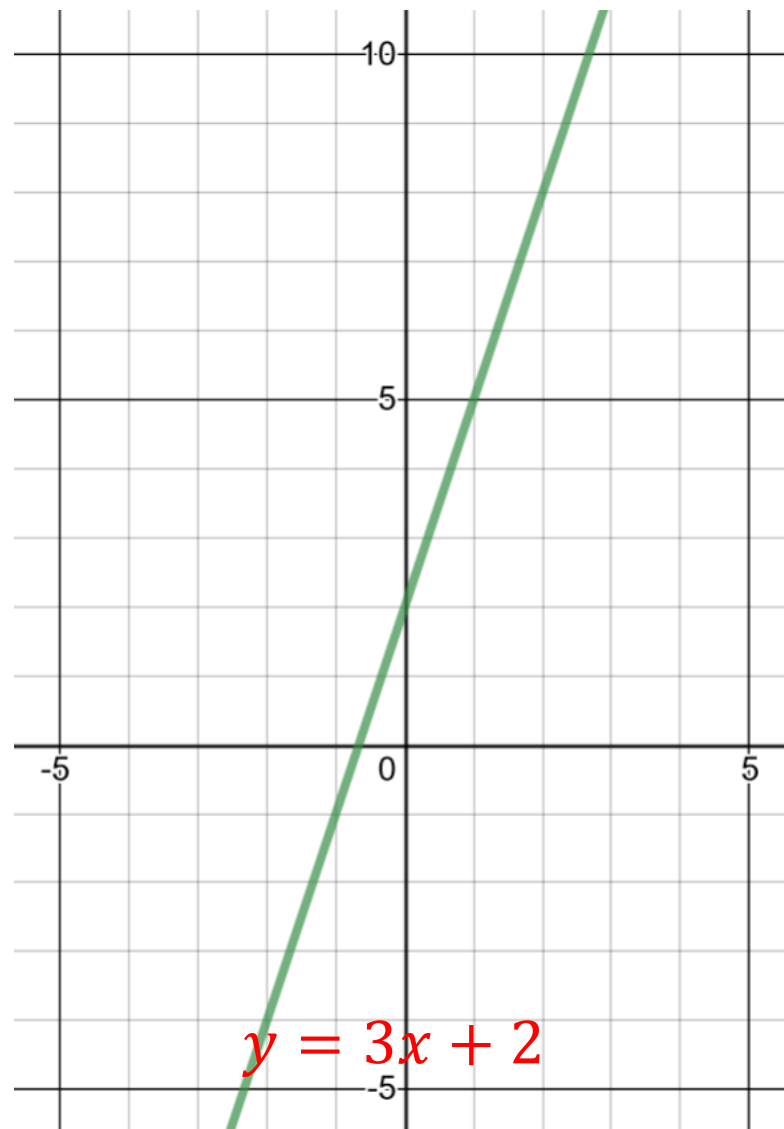
Worked example

Find the equation of the line:



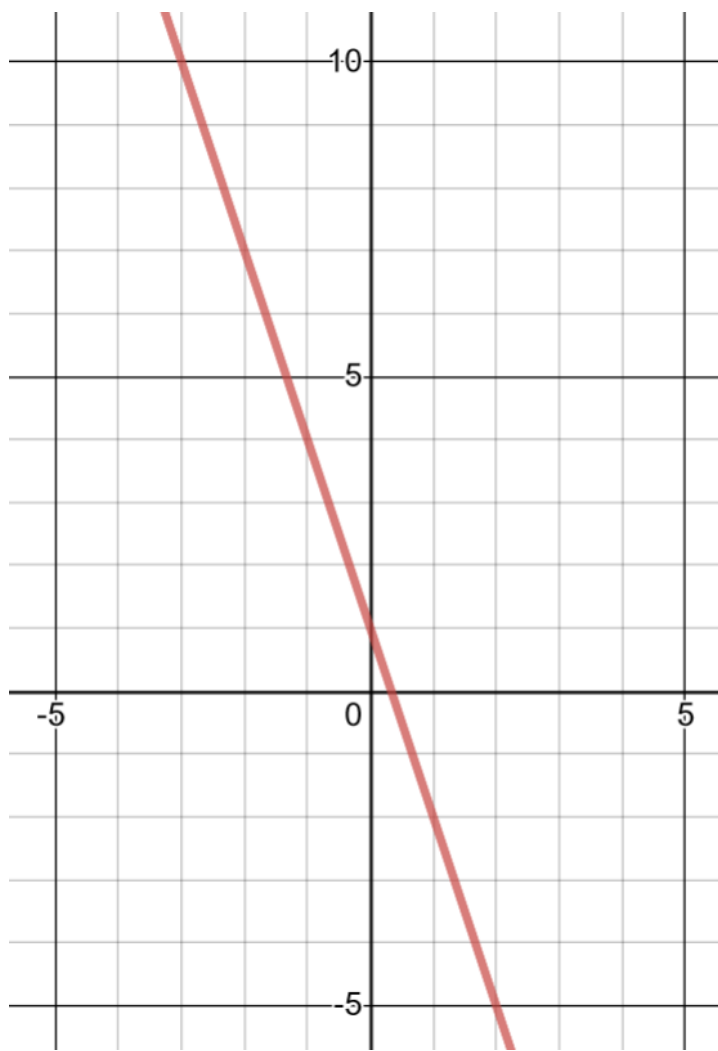
Your turn

Find the equation of the line:



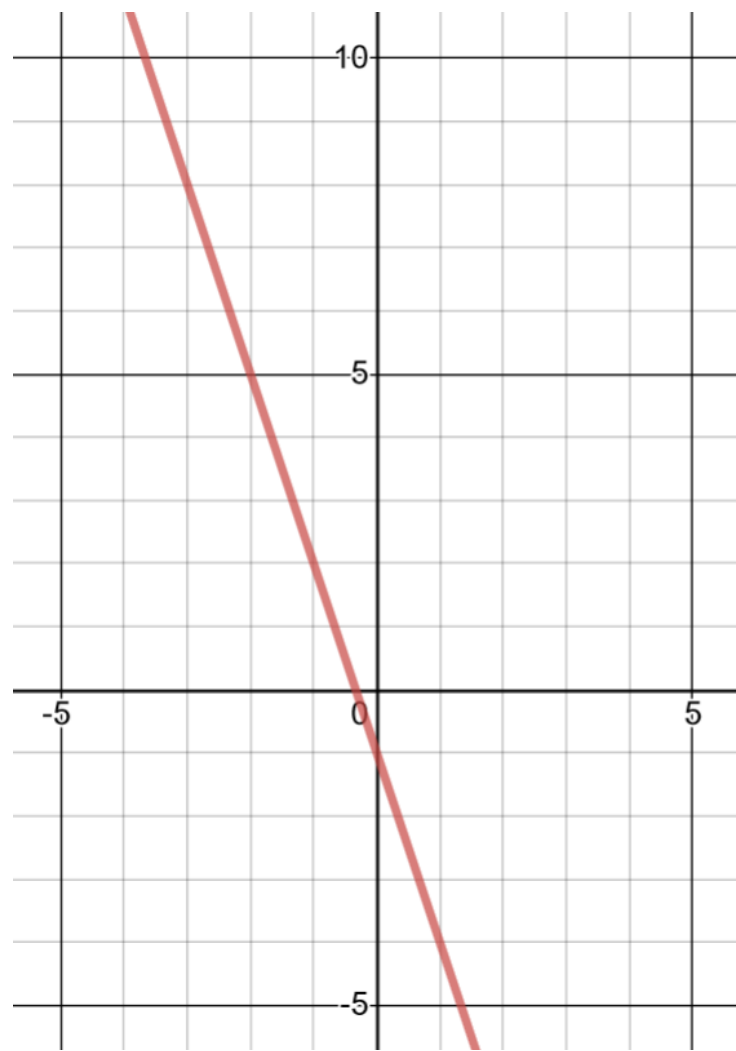
Worked example

Find the equation of the line:



Your turn

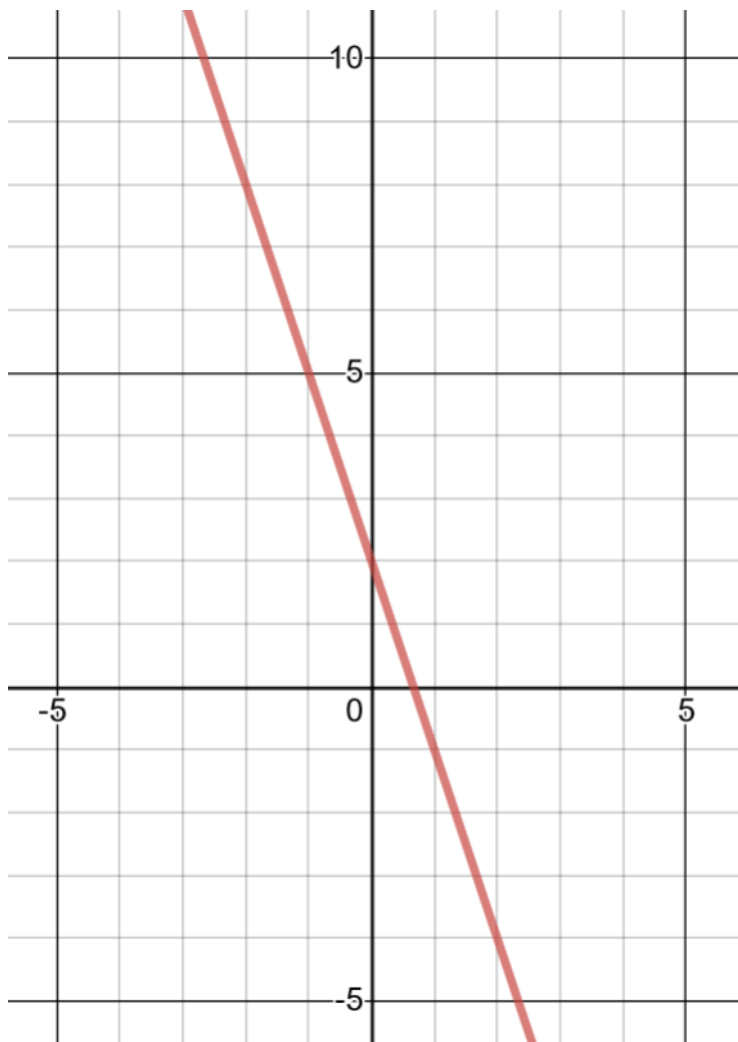
Find the equation of the line:



$$y = -3x - 1$$

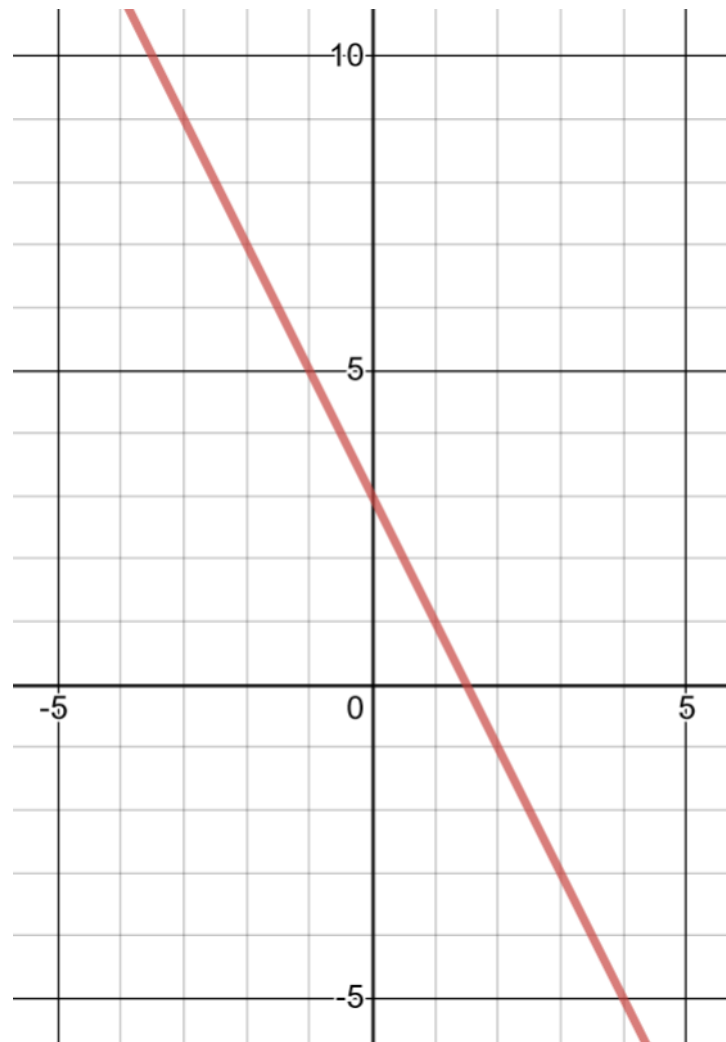
Worked example

Find the equation of the line:



Your turn

Find the equation of the line:



$$y = -2x + 3$$

Worked example

$$y = 2x - 5$$

Gradient:

y -intercept:

x -intercept:

Sketch:

Your turn

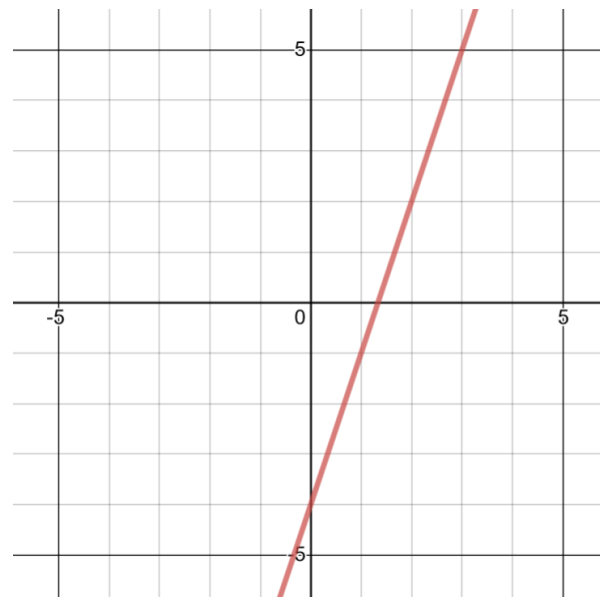
$$y = 3x - 4$$

Gradient: 3

y -intercept: -4

x -intercept: $\frac{4}{3}$

Sketch:



Worked example

$$y = -2x + 6$$

Gradient:

y -intercept:

x -intercept:

Sketch:

Your turn

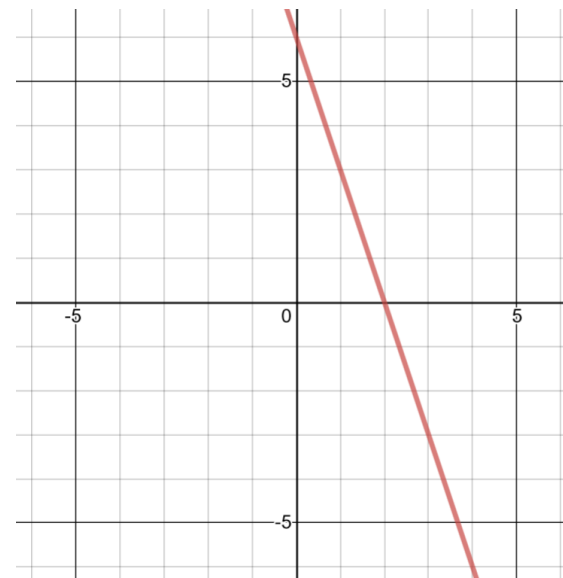
$$y = -3x + 6$$

Gradient: -3

y -intercept: 6

x -intercept: 2

Sketch:



Worked example

$$2x + 3y = 6$$

Gradient:

y -intercept:

x -intercept:

Sketch:

Your turn

$$3x + 2y = 6$$

Gradient:

$$-\frac{3}{2}$$

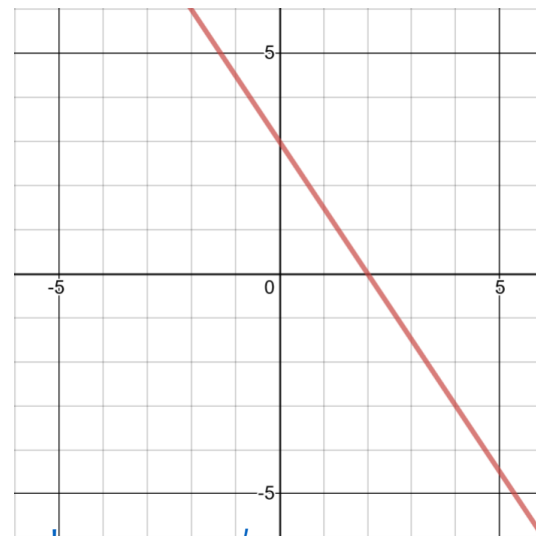
y -intercept:

3

x -intercept:

2

Sketch:



Worked example

Find where the line intercepts the axes:

Line	x-intercept	y-intercept
$y = 2x + 3$		
$y = 3x + 2$		
$y = 3x - 2$		
$y = 2x - 3$		
$y = 3 - 2x$		
$y = 2 - 3x$		
$2x + 3y = 6$		
$3x + 2y = 6$		
$y = ax + b$		

Your turn

Find where the line intercepts the axes:

Line	x-intercept	y-intercept
$y = 4x + 5$	$-\frac{5}{4}$	5
$y = 5x + 4$	$-\frac{4}{5}$	4
$y = 5x - 4$	$\frac{4}{5}$	-4
$y = 4x - 5$	$\frac{5}{4}$	-5
$y = 5 - 4x$	$\frac{5}{4}$	5
$y = 4 - 5x$	$\frac{4}{5}$	4
$4x + 5y = 20$	5	4
$5x + 4y = 20$	4	5
$ax + by = c$	$\frac{c}{a}$	$\frac{c}{b}$

Worked example

Write down the gradient of:

$$2y = 4x + 8$$

$$2y - 4x = 8$$

$$2y + 4x = 8$$

$$4y + 2x = 8$$

Your turn

Write down the gradient of:

$$2y = 2x + 4$$

1

$$2y - 2x = 4$$

1

$$2y + 2x = 4$$

-1

$$4y + 6x = 2$$

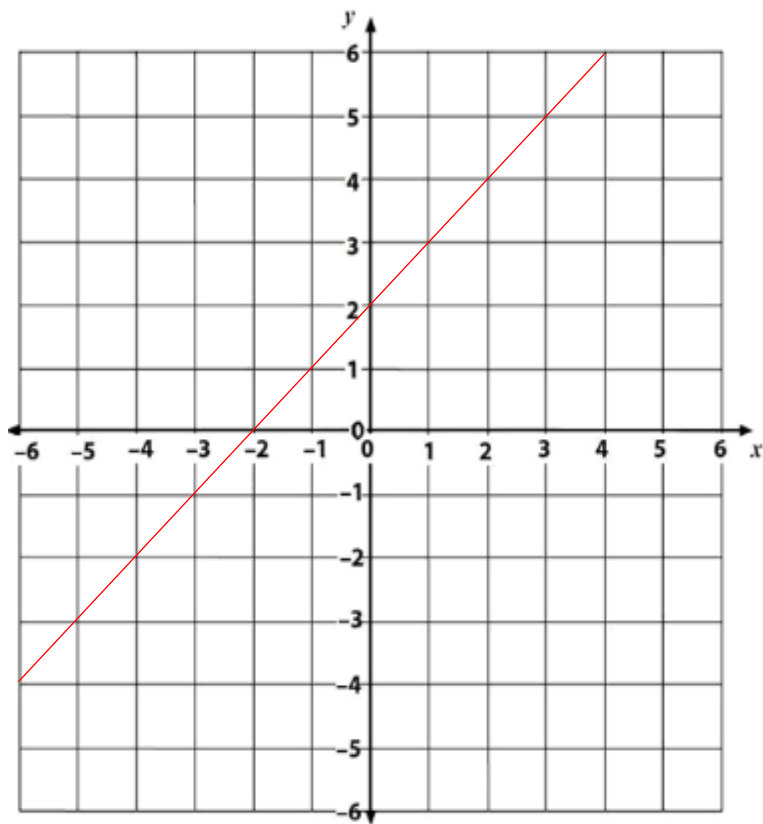
$-\frac{3}{2}$

Worked example

Gradient: $m =$

y-intercept: $c =$

$y = mx + c \rightarrow$

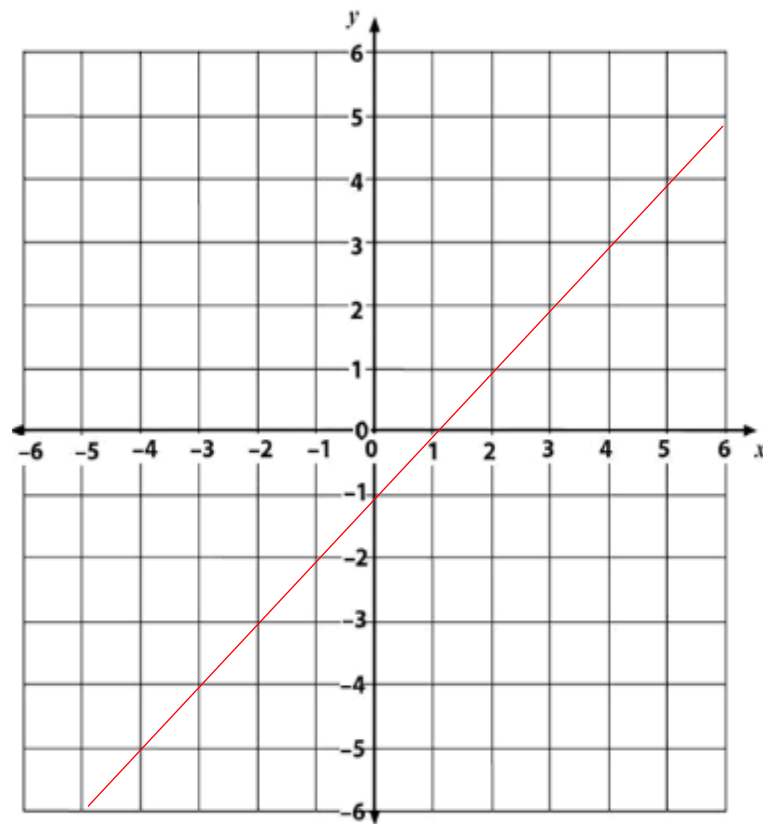


Your turn

Gradient: $m = 1$

y-intercept: $c = -1$

$y = mx + c \rightarrow y = x - 1$

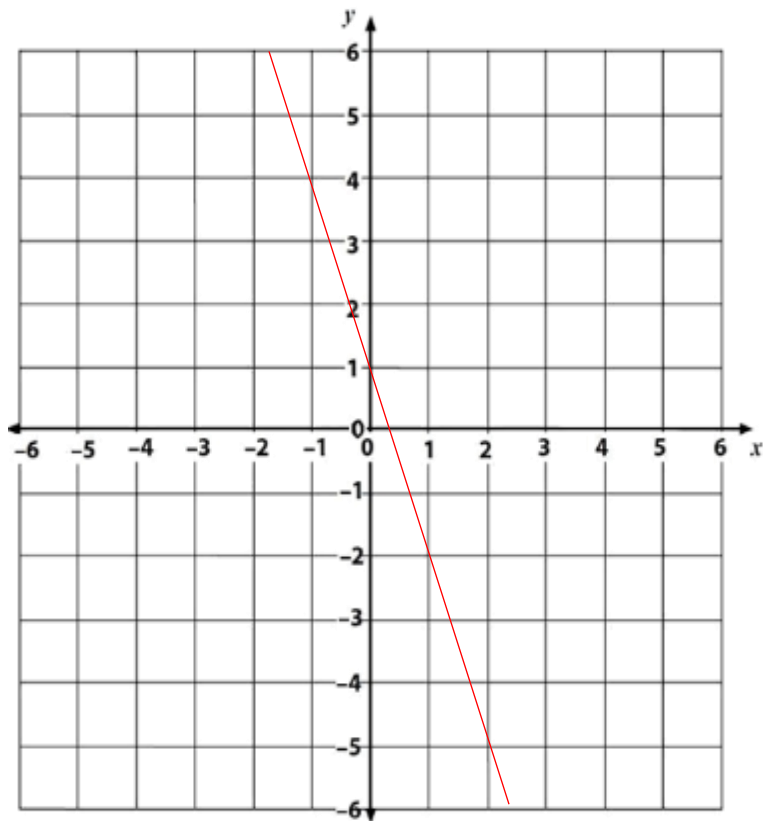


Worked example

Gradient: $m =$

y-intercept: $c =$

$$y = mx + c \rightarrow$$

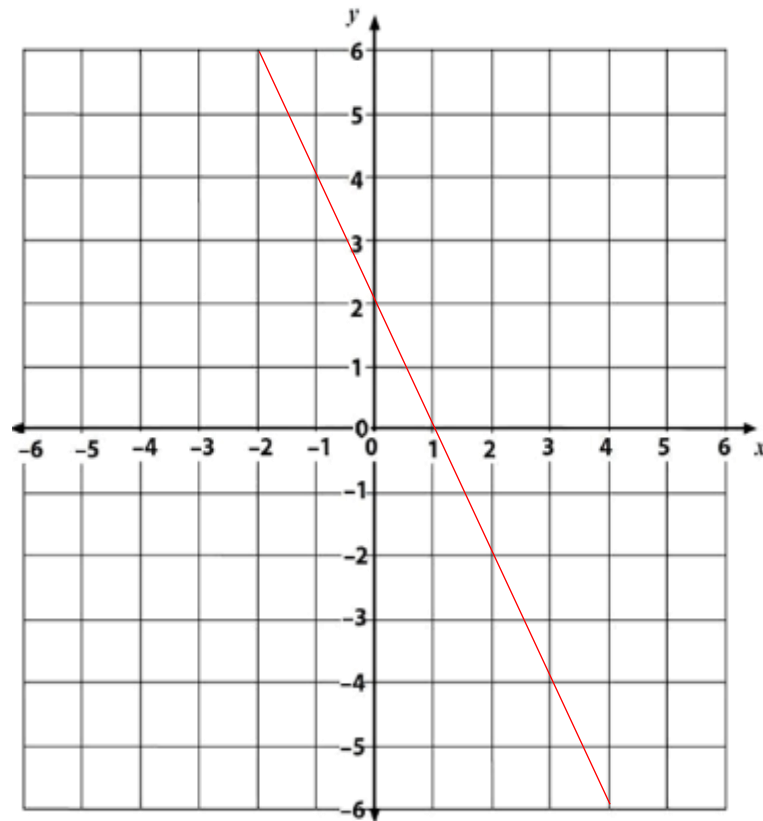


Your turn

Gradient: $m = -2$

y-intercept: $c = 2$

$$y = mx + c \rightarrow y = -2x + 1$$

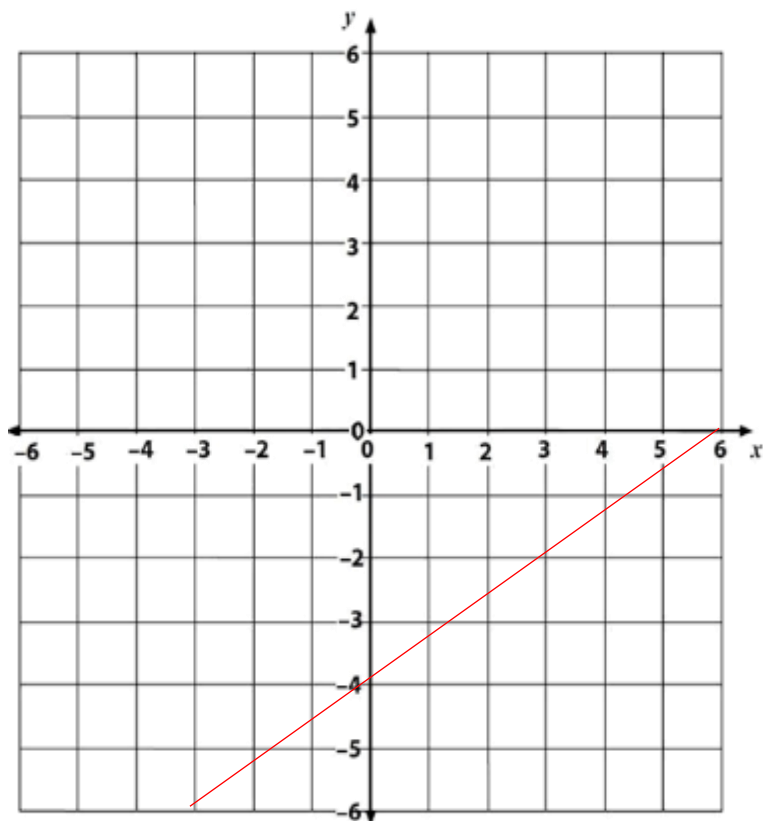


Worked example

Gradient: $m =$

y-intercept: $c =$

$y = mx + c \rightarrow$

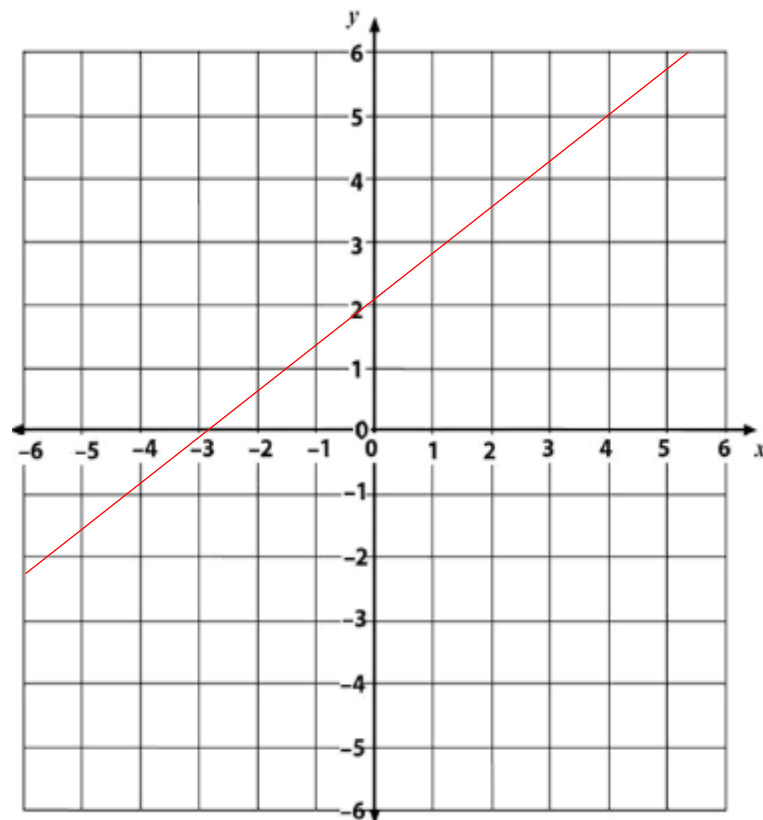


Your turn

Gradient: $m = \frac{3}{4}$

y-intercept: $c = 2$

$y = mx + c \rightarrow y = \frac{3}{4}x + 2$

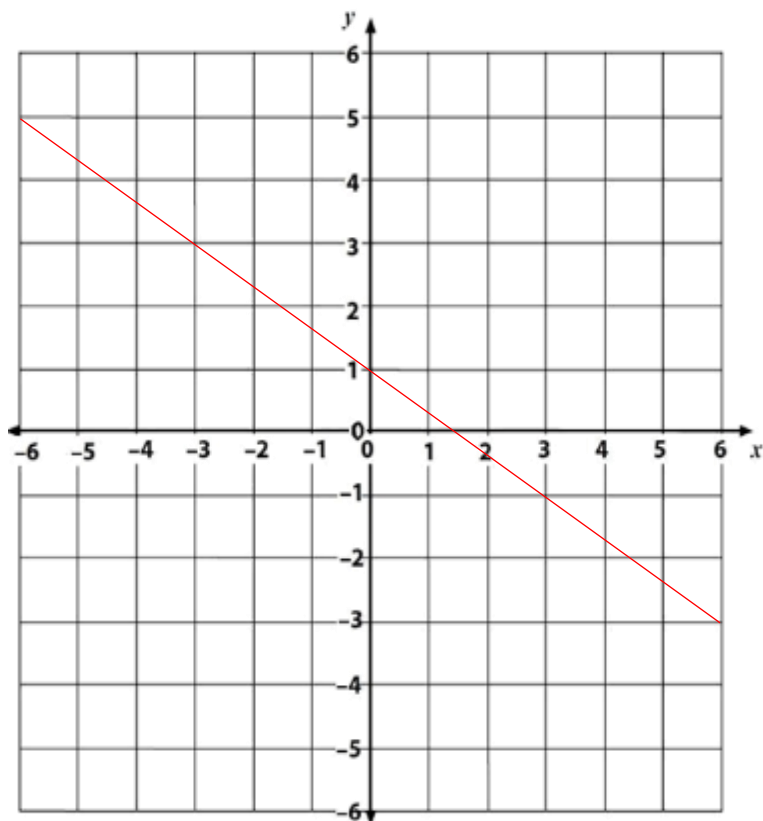


Worked example

Gradient: $m =$

y-intercept: $c =$

$y = mx + c \rightarrow$

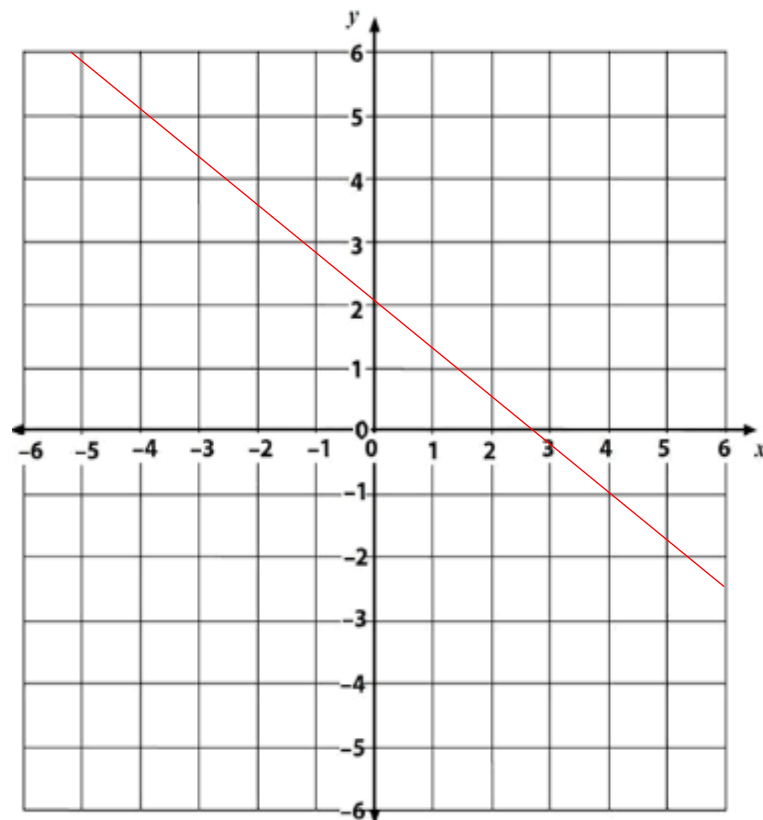


Your turn

Gradient: $m = -\frac{3}{4}$

y-intercept: $c = 2$

$y = mx + c \rightarrow y = -\frac{3}{4}x + 2$

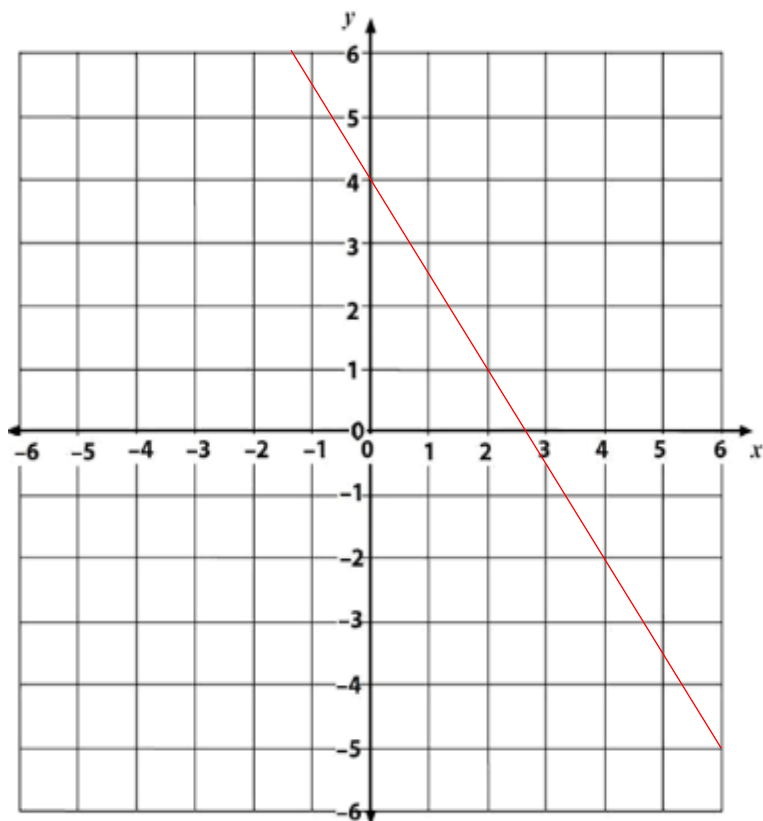


Worked example

Gradient: $m =$

y-intercept: $c =$

$y = mx + c \rightarrow$

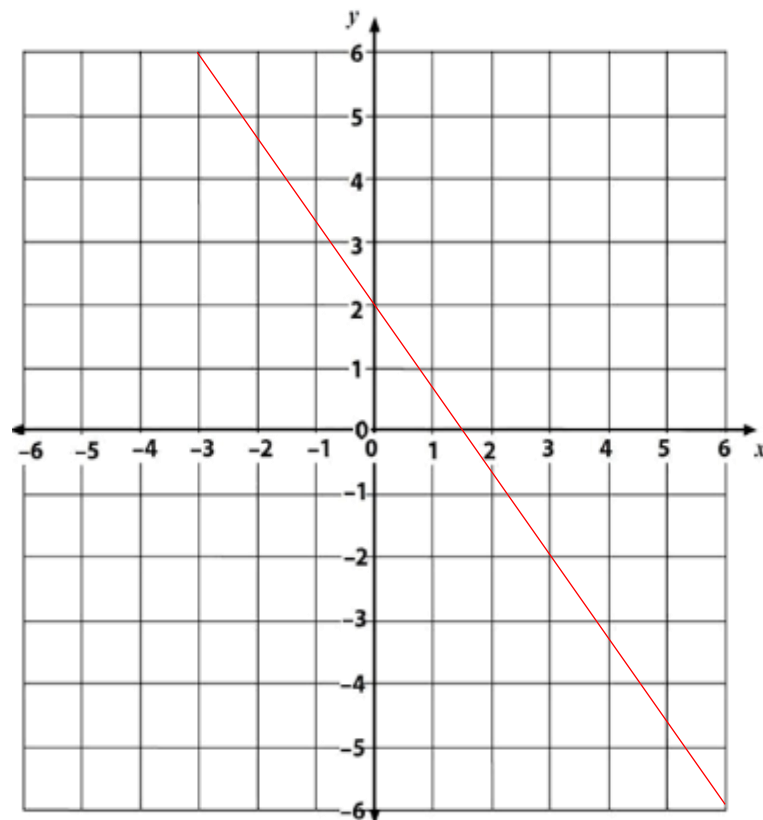


Your turn

Gradient: $m = -\frac{4}{3}$

y-intercept: $c = 2$

$y = mx + c \rightarrow y = -\frac{4}{3}x + 2$



Worked example

Find the equation of the line,
given a point and the gradient:

$(6, 22)$ Gradient 3

$(-6, 22)$ Gradient 3

Your turn

Find the equation of the line,
given a point and the gradient:

$(-2, 5)$ Gradient 4

$$y = 4x + 13$$

Worked example

Write in the form $y = mx + c$ the line with:

Gradient 2 and y-intercept 3

Gradient $\frac{2}{3}$ and y-intercept -3

Gradient $-\frac{3}{2}$ and y-intercept 0

Gradient 0 and y-intercept 4

Your turn

Write in the form $y = mx + c$ the line with:

Gradient 3 and y-intercept 4

$$y = 3x + 3$$

Gradient $-\frac{5}{6}$ and y-intercept -1

$$y = -\frac{5}{6}x - 1$$

Worked example

Find the gradient of the perpendicular line to:

$$y = 2x + 3$$

$$y = 2 - 3x$$

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

$$y = 8 - \frac{11}{5}x$$

Your turn

Find the general equation of the perpendicular line to:

$$y = 4x \qquad y = -\frac{1}{4}x + c$$

$$y = -2x + 4 \qquad y = \frac{1}{2}x + c$$

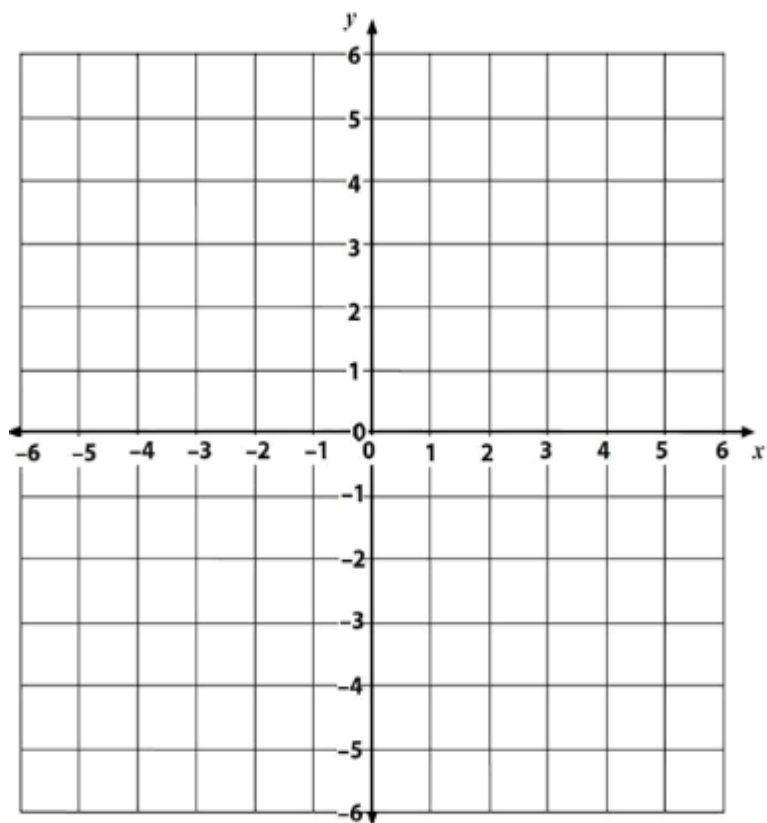
$$y = \frac{3}{4}x - 5 \qquad y = -\frac{4}{3}x + c$$

$$y = 7 - \frac{11}{3}x \qquad y = \frac{3}{11}x + c$$

Worked example

Sketch the graph of $y = 2x - 3$

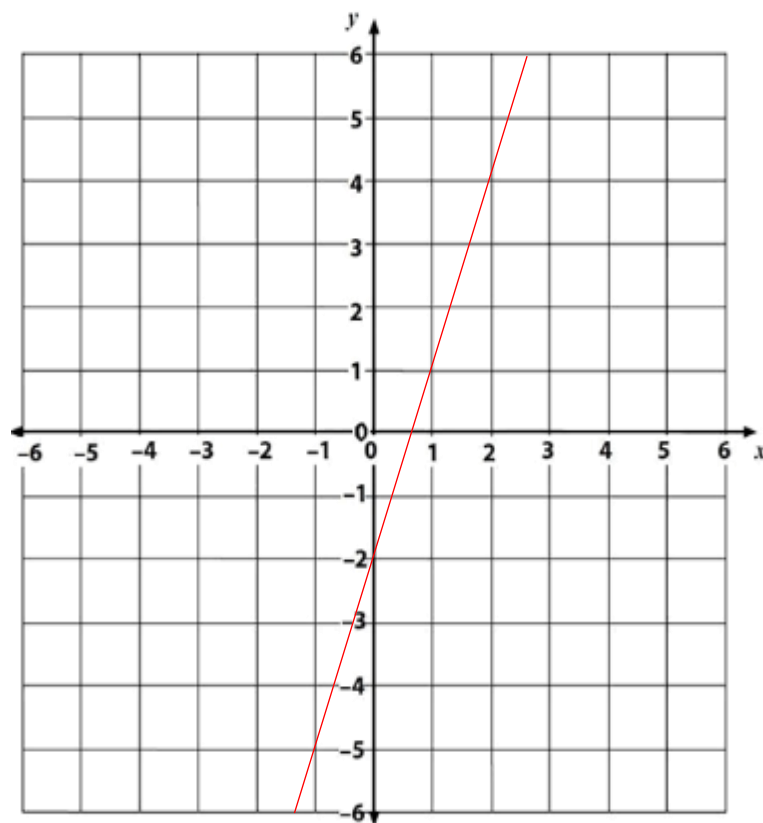
x	0	1	2
y			



Your turn

Sketch the graph of $y = 3x - 2$

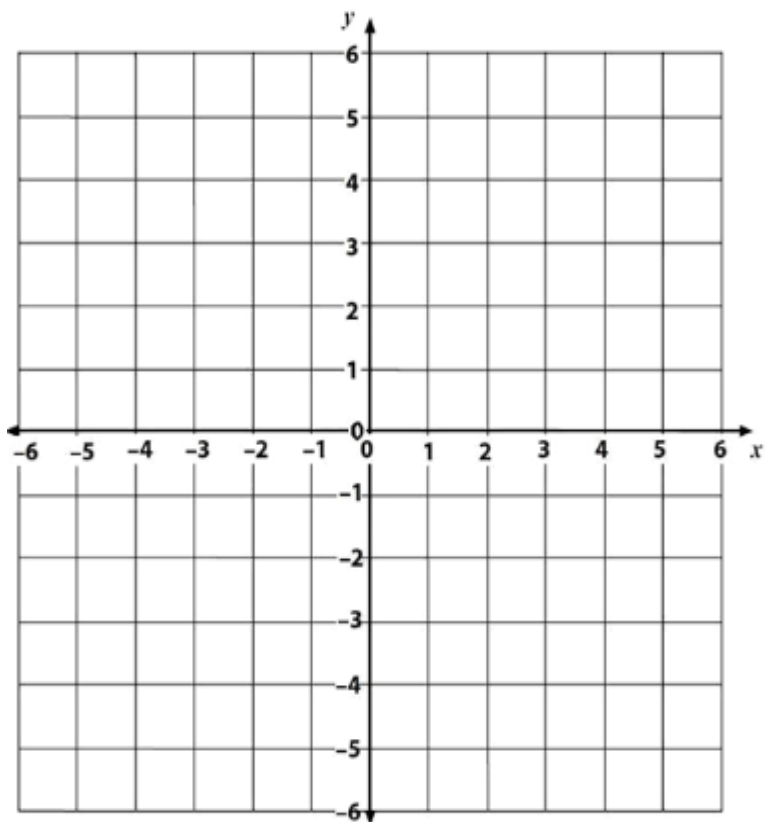
x	0	1	2
y	-2	1	4



Worked example

Sketch the graph of $y = -\frac{3}{4}x + 3$

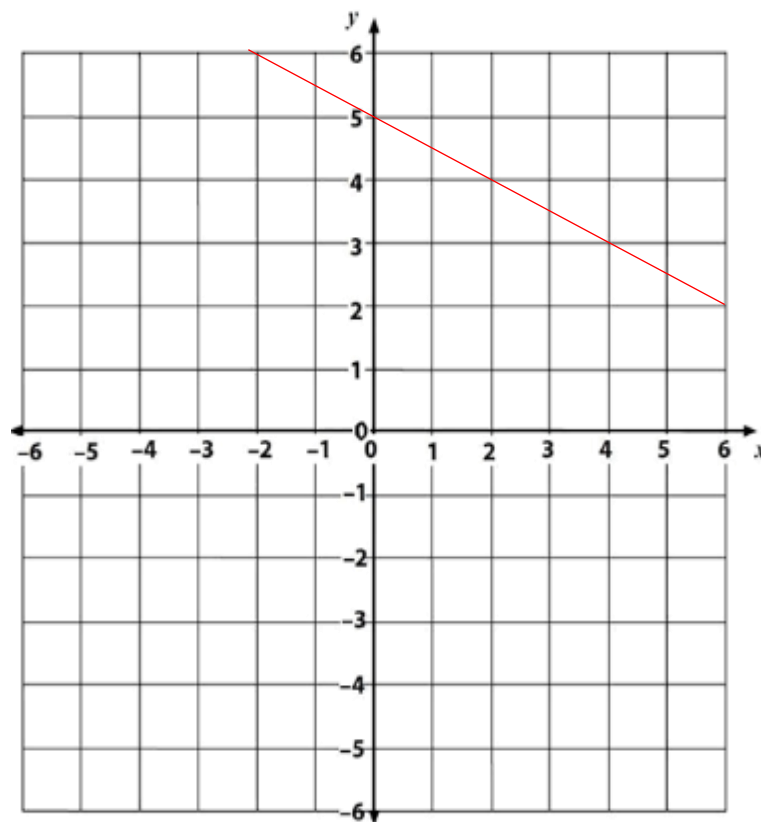
x	0	1	2
y			



Your turn

Sketch the graph of $y = -\frac{1}{2}x + 5$

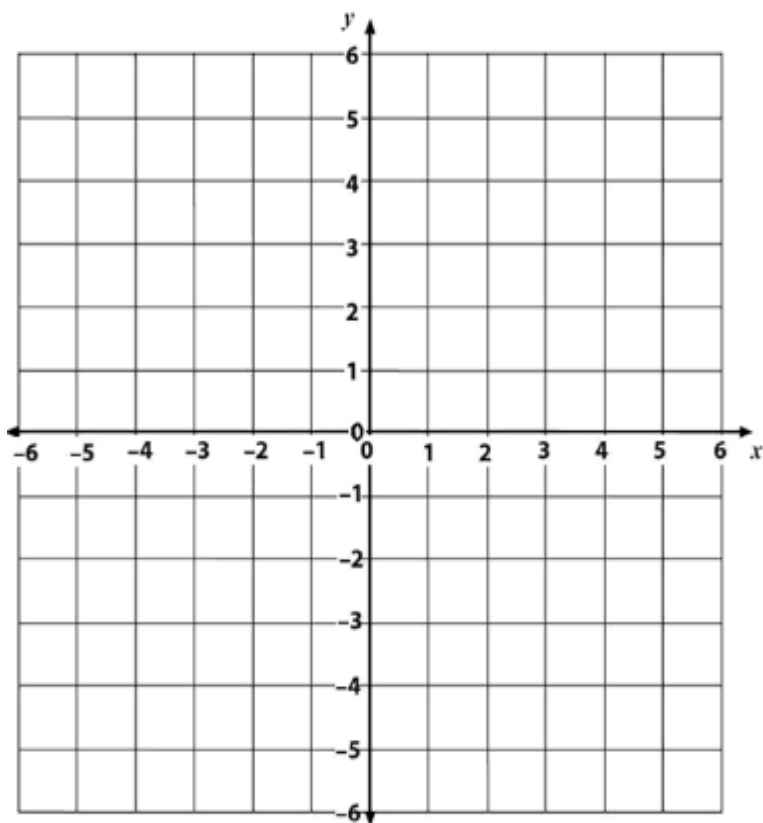
x	0	1	2
y	5	4.5	4



Worked example

Sketch the graph of $x + y = 6$

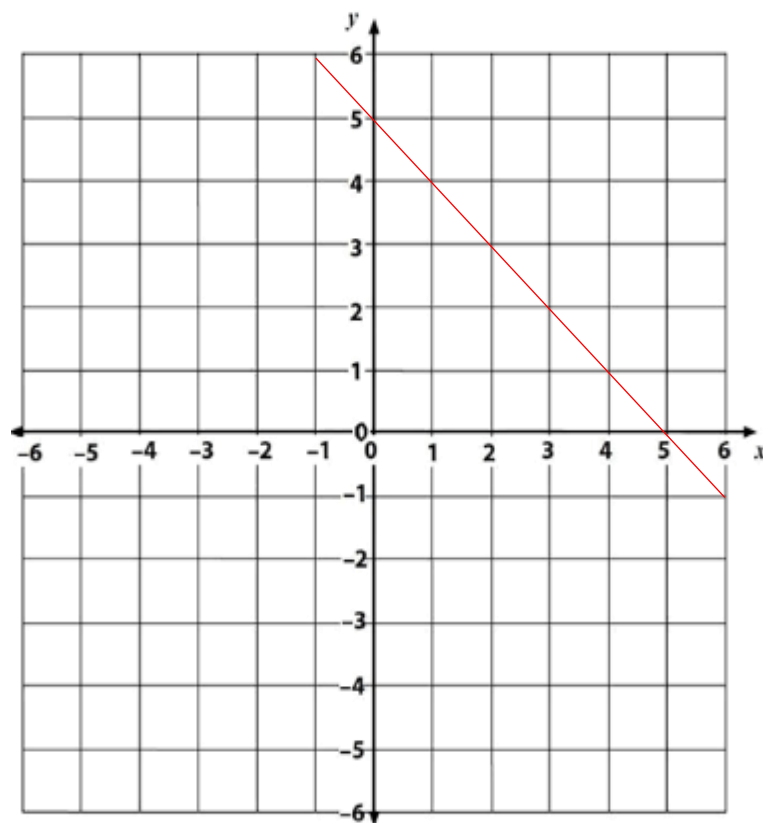
x	0		1
y		0	



Your turn

Sketch the graph of $x + y = 5$

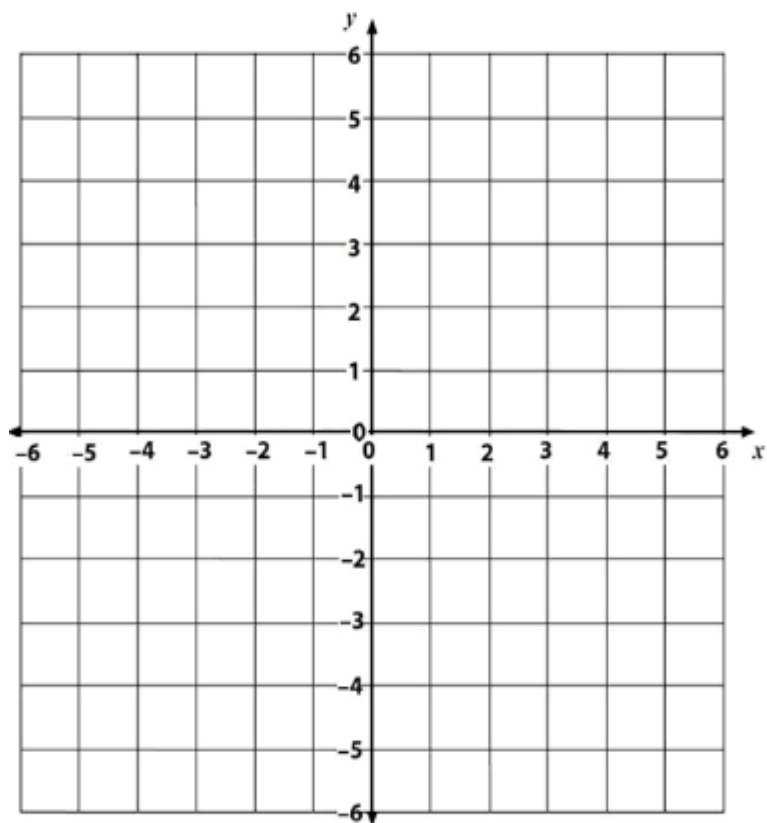
x	0	5	1
y	5	0	4



Worked example

Sketch the graph of $4x + 3y = 12$

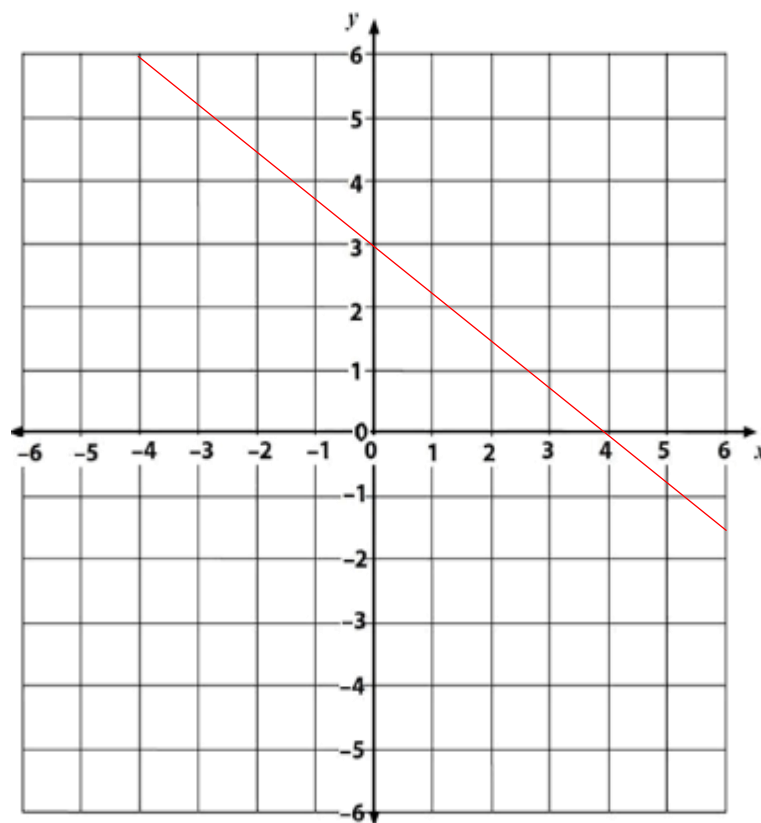
x	0		1
y		0	



Your turn

Sketch the graph of $3x + 4y = 12$

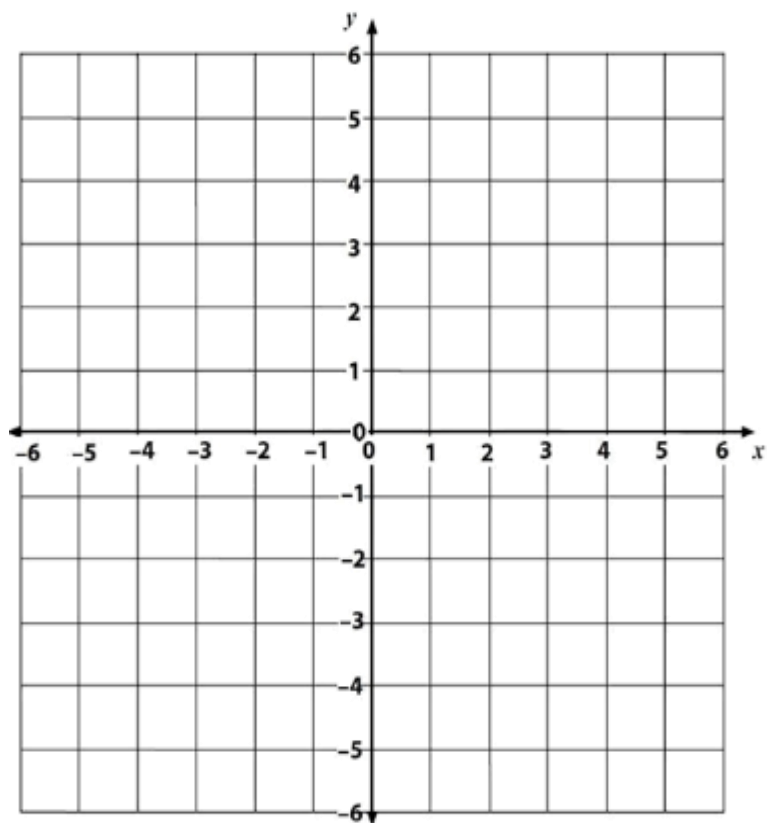
x	0	4	1
y	3	0	2.25



Worked example

Sketch the graph of $4x - 3y = 12$

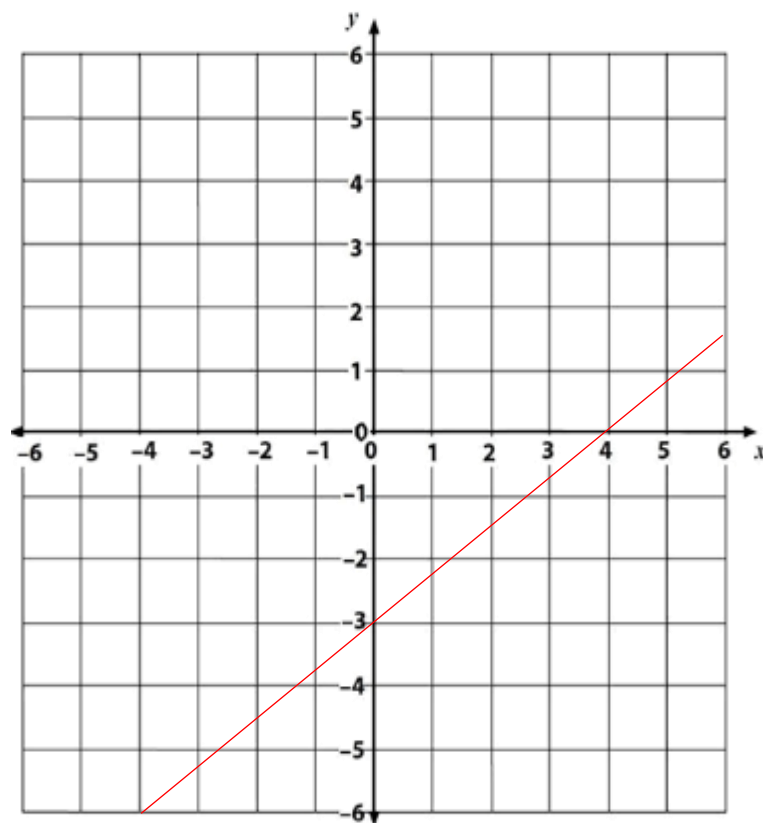
x	0		1
y		0	



Your turn

Sketch the graph of $3x - 4y = 12$

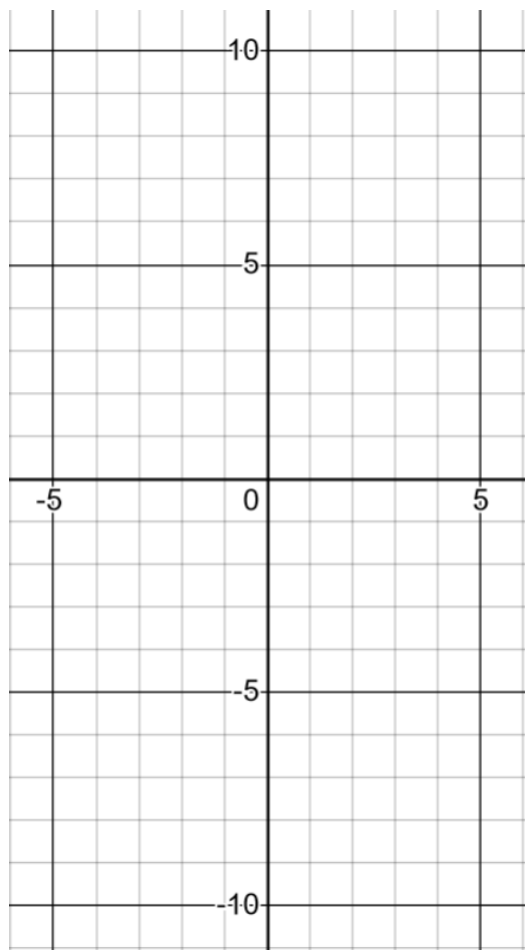
x	0	4	1
y	-3	0	-2.25



Worked example

Sketch using the table of values:

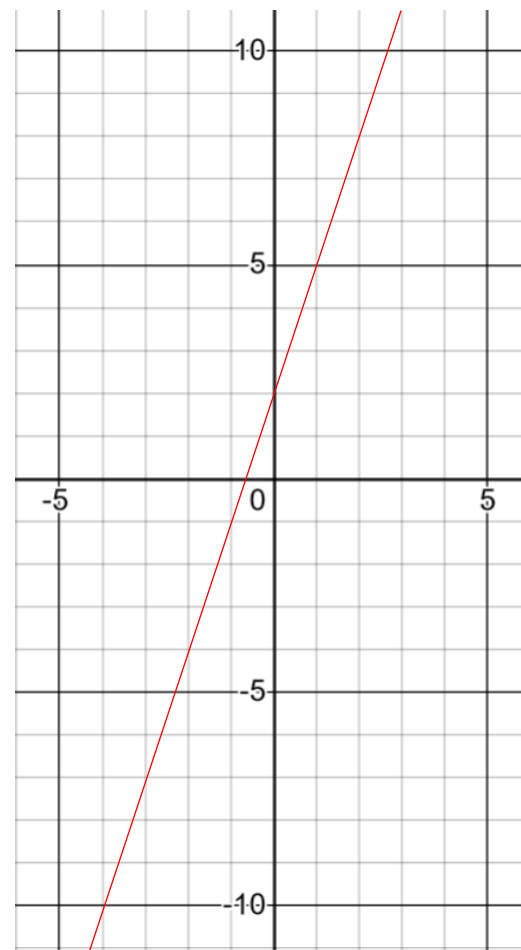
x	-1	0	1	2	3
y	1	3	5	7	9



Your turn

Sketch using the table of values:

x	-1	0	1	2	3
y	-1	2	5	8	11



Worked example

Find the equation of the line parallel to $y = 3x + 5$ that passes through $(-2, 5)$

Find the equation of the line parallel to $y = -\frac{1}{3}x - 4$ that passes through $(-2, 5)$

Your turn

Find the equation of the line parallel to $y = -\frac{1}{2}x - 3$ that passes through $(-2, 5)$

$$y = -\frac{1}{2}x + 4$$

Worked example

Find the equation of the line perpendicular to $y = 2x - 4$ that passes through $(-2, 5)$

Find the equation of the line perpendicular to $y = 4x + 5$ that passes through $(-2, 5)$

Your turn

Find the equation of the line perpendicular to $y = 3x + 2$ that passes through $(9, -7)$

$$y = -\frac{1}{3}x - 4$$

Worked example

Find the equation of the line perpendicular to $y = \frac{1}{2}x - 4$ that passes through $(-2, 5)$

Find the equation of the line perpendicular to $y = -\frac{2}{3}x + 5$ that passes through $(-2, 5)$

Your turn

Find the equation of the line perpendicular to $y = -\frac{4}{3}x + 3$ that passes through $(-12, -5)$

$$y = \frac{3}{4}x + 4$$

Worked example

Find the equation of the line perpendicular to $x + 2y = 5$ which passes through the point $(3, 7)$

Find the equation of the line perpendicular to $3x + 2y = 5$ which passes through the point $(3, 7)$

Your turn

Find the equation of the line perpendicular to $2x + 3y = 5$ which passes through the point $(4, 7)$

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

Worked example

Write down an equation of a line parallel to $y = 3x - 4$ which passes through the origin.

Write down an equation of a line parallel to $y = 3 - 4x$ which passes through the origin.

Your turn

Write down an equation of a line parallel to $y = -2x + 5$ which passes through the origin.

$$y = -2x$$

Worked example

Calculate the gradient between the coordinates:

$(2, 1)$ and $(5, 7)$

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

Your turn

Calculate the gradient between the coordinates:

$(-4, 2)$ and $(6, 8)$

$\frac{3}{5}$

Worked example

Calculate the gradient between the coordinates:

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

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

Your turn

Calculate the gradient between the coordinates:

$(-4, 2)$ and $(-6, -8)$

5

Worked example

Write the equation of the line in the form $y = mx + c$ which passes through the points $(2, 3)$ and $(5, 9)$

Write the equation of the line in the form $y = mx + c$ which passes through the points $(2, 3)$ and $(5, -9)$

Your turn

Write the equation of the line in the form $y = mx + c$ which passes through the points $(3, 10)$ and $(-5, 18)$

$$y = -x - 7$$

Worked example

Write the equation of the line in the form $y = mx + c$ which passes through the points $(2, -3)$ and $(7, -5)$

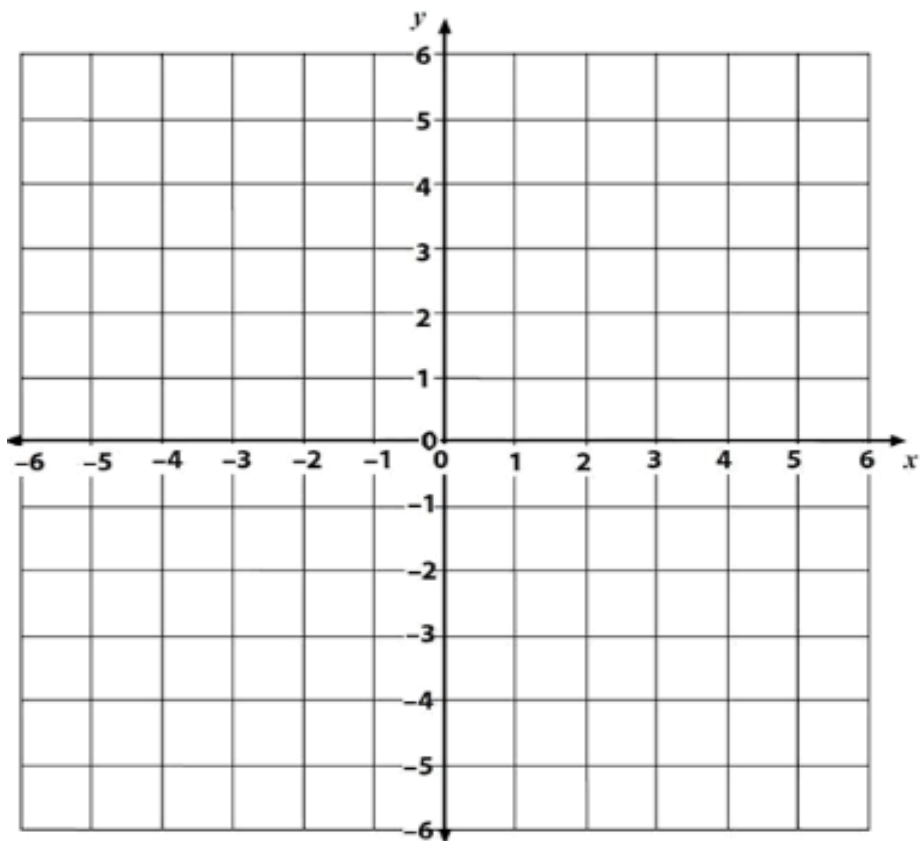
Your turn

Write the equation of the line in the form $y = mx + c$ which passes through the points $(3, -2)$ and $(-7, 5)$

$$y = -\frac{3}{10}x - \frac{11}{10}$$

Worked example

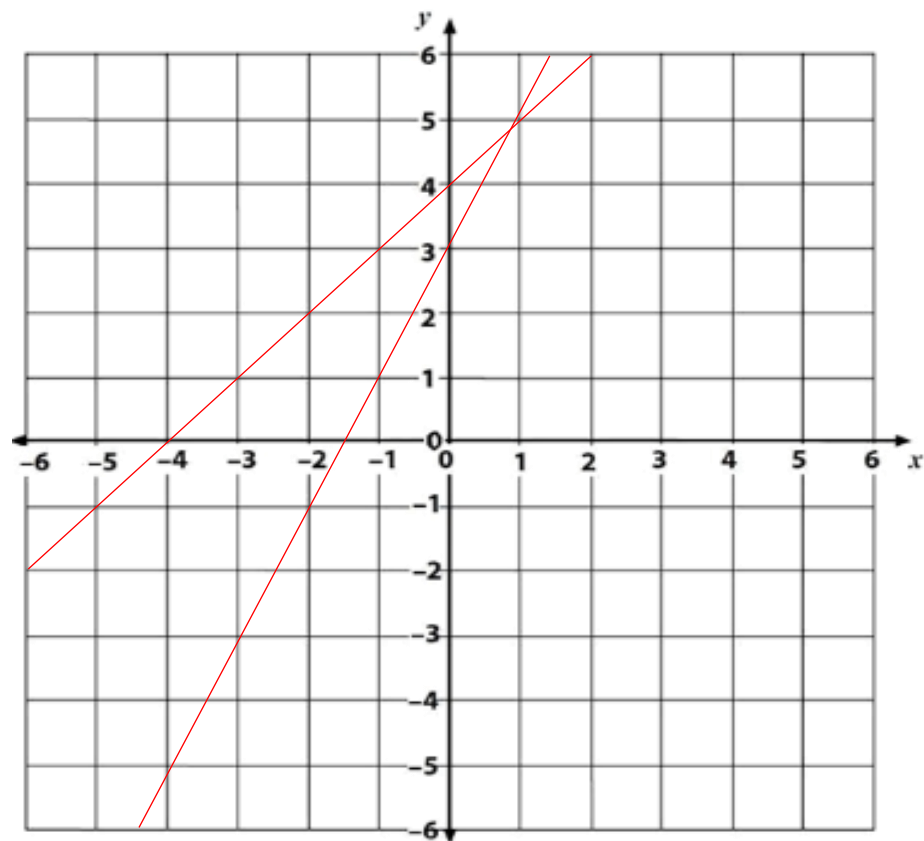
Find the point of intersection of
 $y = 2x - 2$ and $y = 5x + 1$



Your turn

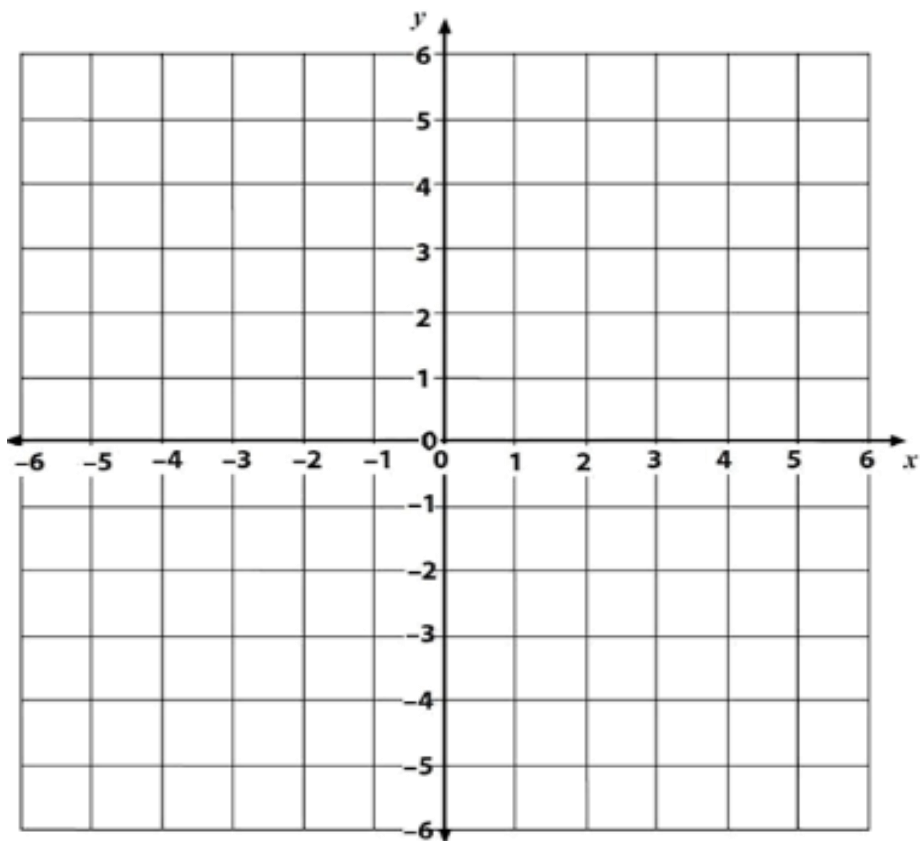
Find the point of intersection of
 $y = 2x + 3$ and $y = x + 4$

(1, 5)



Worked example

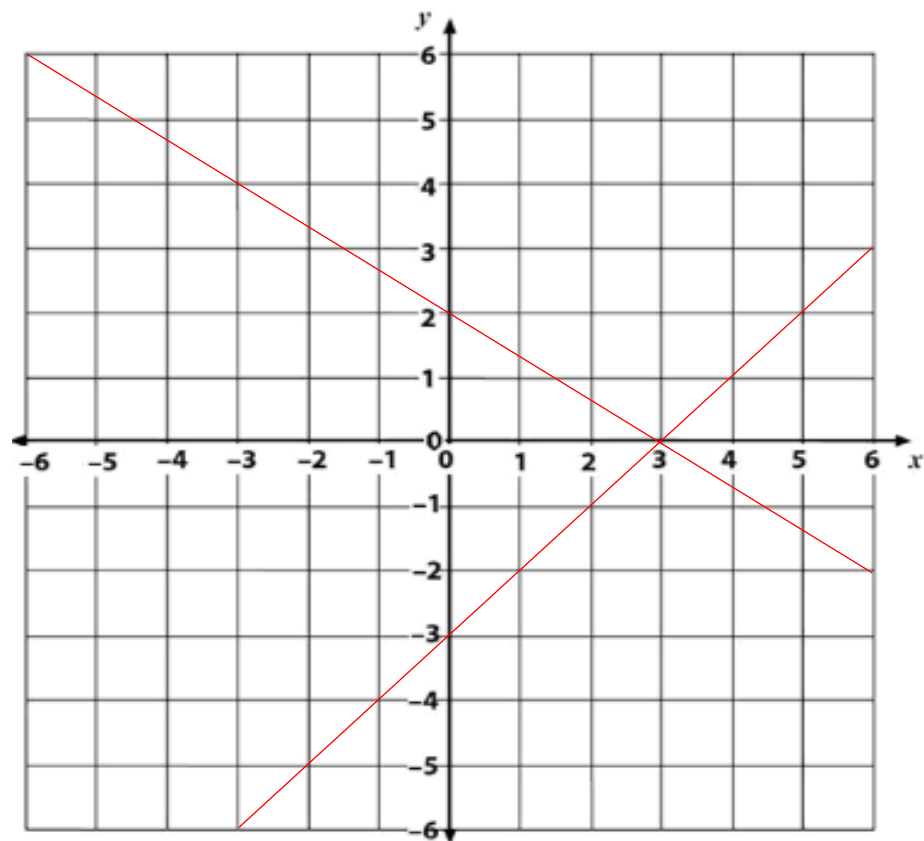
Find the point of intersection of
 $y = 2x - 4$ and $3x + 2y = 6$



Your turn

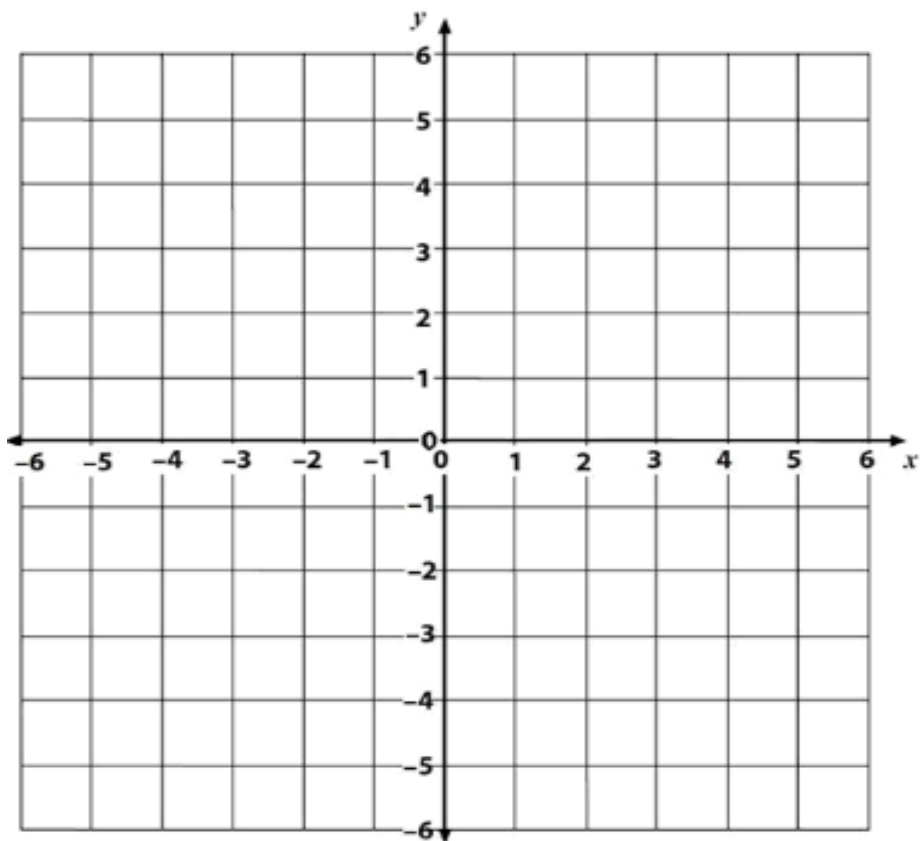
Find the point of intersection of
 $y = x - 3$ and $2x + 3y = 6$

$(3, 0)$



Worked example

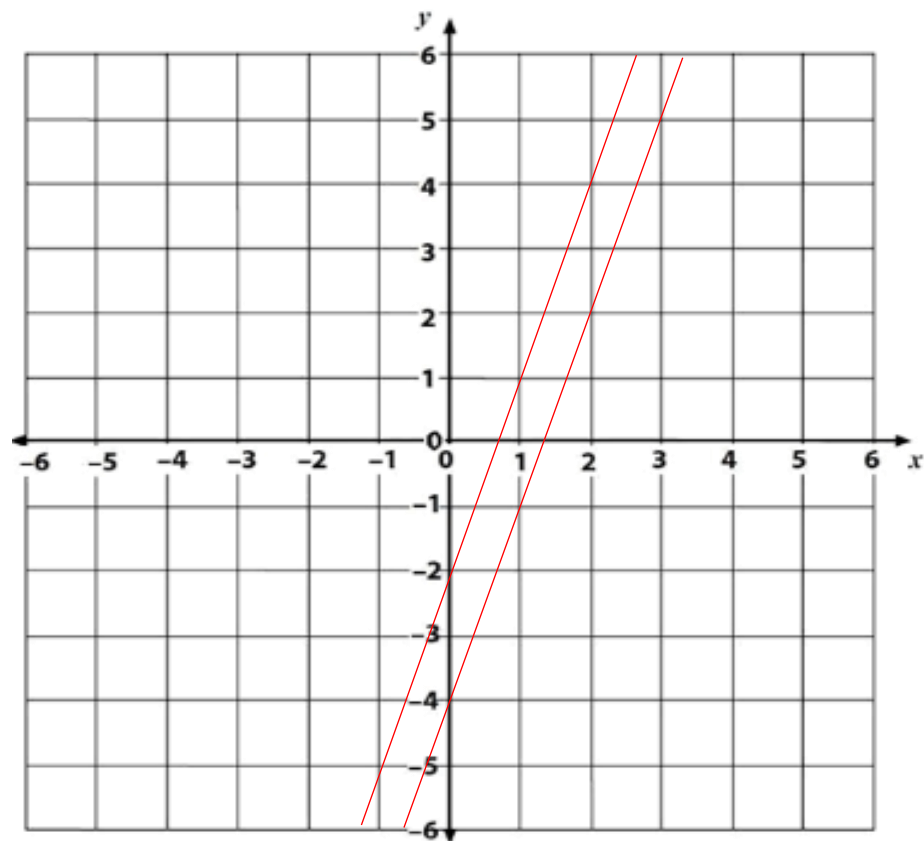
Find the point of intersection of
 $y = 2x - 2$ and $y = 2x + 3$



Your turn

Find the point of intersection of
 $y = 3x - 2$ and $y = 3x - 4$

No point of intersection - the lines
are parallel



Worked example

Find the distance between the line segment connecting:

$(2, 4)$ and $(8, 8)$

$(-2, 4)$ and $(-9, 9)$

Your turn

Find the distance between the line segment connecting:

$(2, -4)$ and $(11, 8)$

15

Worked example

Find the midpoint of the line segment between:

$(2, 4)$ and $(8, 8)$

$(-2, 4)$ and $(-9, 9)$

Your turn

Find the midpoint of the line segment between:

$(2, -4)$ and $(11, 8)$

$(6.5, 2)$

Worked example

A is the point $(3, 8)$

B is the point $(1, -2)$

C is the midpoint of AB .

Find the equation of the line perpendicular to AB which passes through C

Your turn

A is the point $(3, 8)$

B is the point $(1, 4)$

C is the midpoint of AB .

Find the equation of the line perpendicular to AB which passes through C

$$y = -\frac{1}{2}x + 7$$

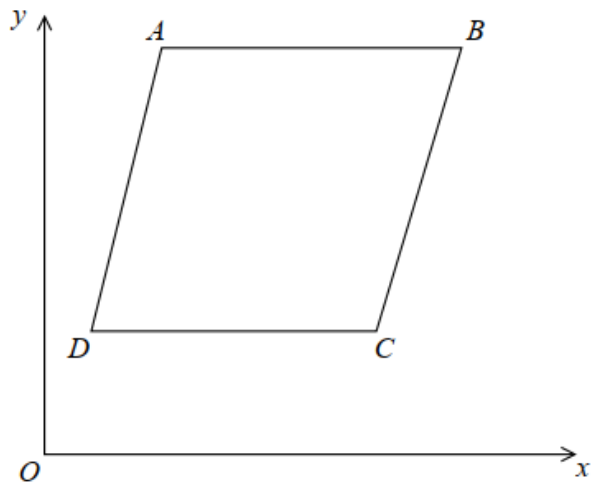
Worked example

ABCD is a rhombus.

A has coordinates (5, 10)

The equation of DB is $y = \frac{1}{2}x + 5$.

Find an equation of diagonal AC



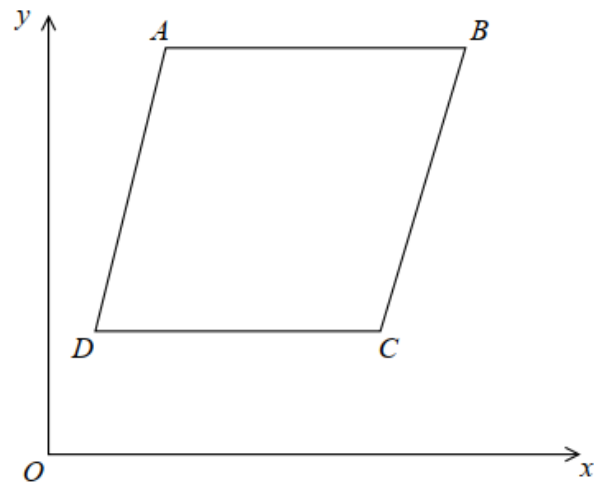
Your turn

ABCD is a rhombus.

A has coordinates (5, 11)

The equation of DB is $y = \frac{1}{2}x + 6$.

Find an equation of diagonal AC



$$y = -2x + 21$$

Worked example

Calculate the gradient between the coordinates:

$(7, 9a)$ and $(10, 4a)$

$(2a, 5)$ and $(7a, 8)$

Your turn

Calculate the gradient between the coordinates:

$(4, 8a)$ and $(11, 2a)$

$$-\frac{6a}{7}$$

Worked example

The gradient connecting the two points $(2a, 5)$ and $(7a, 8)$ is 6.
Solve for a

Your turn

The gradient connecting the two points $(3a, 7)$ and $(5a, 12)$ is 6.
Solve for a

$$a = \frac{5}{12}$$

Worked example

The gradient connecting the two points $(2, -5)$ and (a, b) is 4. Find an expression for b in terms of a

Your turn

The gradient connecting the two points $(-3, 4)$ and (a, b) is 2. Find an expression for b in terms of a

$$b = 2a + 10$$