

Equation of a straight line

Finding the gradient

$(0, 5)$ and $(2, 11)$

x_1, y_1 x_2, y_2

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{11 - 5}{2 - 0}$$

$$m = \frac{6}{2}$$

$$m = 3$$

Finding the equation

First, find the gradient.

ie: $m = 3$

Then chose a point.

ie: $(0, 5)$ for (a, b)

$$y - b = m(x - a)$$

$$y - 5 = 3(x - 0)$$

$$y - 5 = 3x$$

$$y = 3x + 5$$

Finding the intercepts

For the x - intercept (root), make $y = 0$.

ie: $5x + 2y = 10$

$$5x + 2(0) = 10$$

$$5x = 10$$

$$x = 2$$

x-intercept at $(2, 0)$.

For the y-intercept, repeat the above, but make $x = 0$ instead.

1. Find the **gradient** of the line joining the points:

(a) $(3, 5)$ and $(4, 9)$

(b) $(1, 5)$ and $(6, 15)$

(c) $(3, 8)$ and $(5, 9)$

(d) $(0, 5)$ and $(1, 7)$

(e) $(0, -2)$ and $(3, 4)$

(f) $(0, 0)$ and $(5, 15)$

(g) $(1, 7)$ and $(3, -3)$

(h) $(-2, -1)$ and $(8, 4)$

(i) $(1, -1)$ and $(-3, -1)$

(j) $(3, 5)$ and $(6, 5)$

(k) $(2, -2)$ and $(2, 7)$

2. Find the **equation** of the line joining the two points:

(a) $(0, 5)$ and $(2, 9)$

(b) $(1, 2)$ and $(6, 12)$

(c) $(3, 8)$ and $(4, 9)$

(d) $(0, 5)$ and $(1, 7)$

(e) $(0, -2)$ and $(3, 4)$

(f) $(0, -3)$ and $(6, 15)$

(g) $(1, 7)$ and $(3, -3)$

(h) $(-4, -1)$ and $(6, 4)$

(i) $(-11, -7)$ and $(-3, -1)$

(j) $(3, 7)$ and $(6, 7)$

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

3. Find the equation of each line.

(a) $m = 3$, passing through $(2, 5)$

(b) $m = 4$, passing through $(-2, 1)$

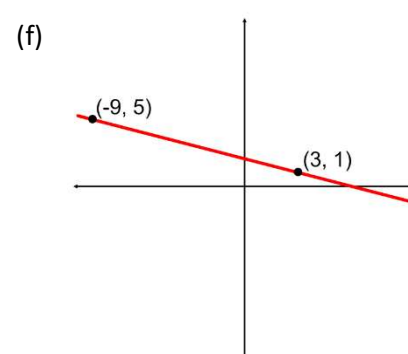
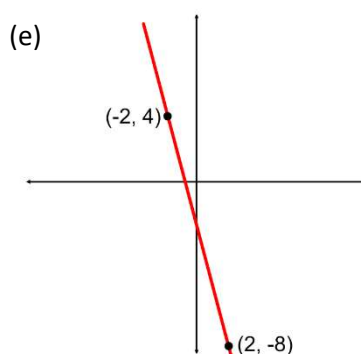
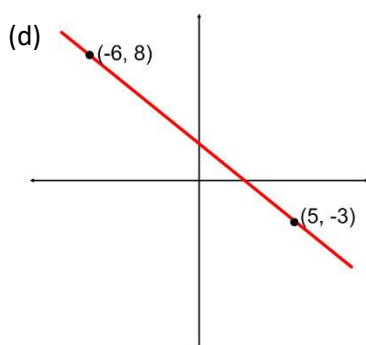
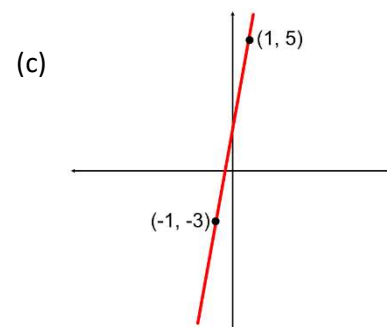
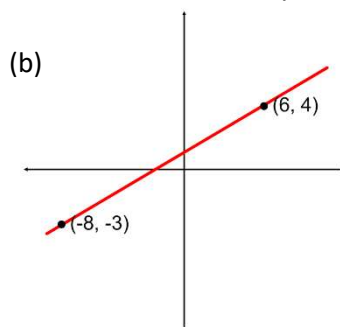
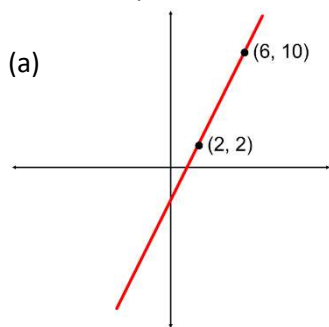
(c) $m = -2$, passing through $(-1, 3)$

(d) $m = \frac{1}{2}$, passing through $(3, 7)$

(e) $m = \frac{3}{2}$, passing through $(-5, 2)$

(f) $m = -\frac{2}{3}$, passing through $(6, -1)$

3. Find the equation of each line shown in terms of x and y :



4. Write down the gradient and y -intercept of the following lines:

(a) $y = 2x + 5$

(b) $y = -3x + 1$

(c) $y = 3 - 4x$

(d) $y = 5$

(e) $2y = 4x + 6$

(f) $3y = 5x - 9$

(g) $-2y = 4x + 8$

(h) $y + x = -5$

(i) $y - 2x + 2 = 0$

(j) $2y + 5x = 6$

(k) $x + 2y = 3$

(l) $3x + 5y - 6 = 0$

5. For each set of points, find

(i) The gradient

(ii) the equation of the line joining the points

(iii) the x -intercept and y -intercept

(a) (3, 2) and (6, 8)

(b) (-2, 1) and (2, 9)

(c) (2, 5) and (6, 7)

(d) (5, 3) and (11, 5)

(e) (3, 3) and (-2, -2)

(f) (-3, -7) and (-1, 5)