

(1) Find the gradient of the line passing through each set of points given below:

- (a) (2,1) and (6,9)
- (b) (4,7) and (2,5)
- (c) (-3,2) and (2,-1)
- (d) $\left(\frac{1}{2}, 3\right)$ and $\left(\frac{3}{2}, -\frac{3}{4}\right)$

(2) The gradient of the line passing through the points $(p, 5)$ and $(1, -7)$ is 4.

Find the value of p .

(3) State the gradient and y intercept of the following lines:

- (a) $y = 3x - 1$
- (b) $y = -2x + 5$
- (c) $y = \frac{1}{2} - x$
- (d) $y = 3(2x + 1)$
- (e) $y = -\frac{1}{3}x$

(4) The line $y = 3x + c$ passes through the point $(1, 5)$. Find the coordinates where the line crosses the x axis.

(5) State the gradient and y intercept of the following lines:

- (a) $8x + 4y - 3 = 0$
- (b) $3x - 2y + 5 = 0$
- (c) $5x - 6y = 4$
- (d) $ax + by + c = 0$

(6) Find the equation of the straight line with the given gradient and point in the form $y = mx + c$:

- (a) Gradient = 3, point (2,1)
- (b) Gradient = -1, point (3,-2)
- (c) Gradient = $\frac{1}{4}$, point (-8,2)
- (d) Gradient = 0.2, point $\left(5, \frac{1}{4}\right)$
- (e) Gradient = m , point $(0, m)$

(7) Find the equation of the straight line passing through the given points in the form

$$y = mx + c :$$

- (a) (2,1) and (4,5)
- (b) (-1,5) and (2,-3)
- (c) (5,-7) and the origin.
- (d) $\left(2, \frac{1}{3}\right)$ and $\left(4, \frac{2}{3}\right)$

(8) Find the equation of the straight line passing through the given points in the form

$$ax + by + c = 0 :$$

- (a) (6,10) and (4,6)
- (b) (3,0) and (0.5,4)
- (c) (-3,0) and (0,-3)
- (d) (-1,-3) and $\left(2, \frac{1}{4}\right)$

(9) The line l has gradient 4 and crosses the x axis at the point $(3, 0)$. Find where it crosses the y axis.

(10) The line l with gradient 3 passing through the point $(2, 4)$ intersects the line $2x - y = 5$ at the point P . Find the coordinates of P .

(11) Find the distance between the two given points leaving your answer in exact form where appropriate:

- (a) (5,6) and (1,3)
- (b) (4,1) and (10,9)
- (c) (-1,-4) and the origin.
- (d) (-1,-1) and (1,1)
- (e) (5,3) and (5,7)

(12) Given the distance between the points $(p, 3)$ and $(4, 1)$ is $2\sqrt{5}$ find the possible values of p .

(13) The distance between the points $(10, q)$ and $(q, 12)$ is 10. Find the possible values of q .

(14) Find the midpoint of the following pairs of coordinates:

- (a) (2,1) and (6,9)
- (b) (4,7) and (2,5)
- (c) (-1,5) and (2,-3)
- (d) (0.5,3) and $\left(\frac{1}{4}, -\frac{1}{3}\right)$

(15) The midpoint of the points $(12, 7)$ and $(p, 3)$ is $(5, q)$. Find the values of p and q .

(16) Write down the gradient of a line (i) parallel to and (ii) perpendicular to the following lines:

- (a) $y = 3x - 1$
- (b) $y = 4 - 2x$
- (c) $x + y = 0$
- (d) $2x + 3y = 7$
- (e) $px - qy - 4 = 0$

(17) Find an equation of the line (i) parallel to and (ii) perpendicular to the line $y = 5x + 1$ that passes through the point $(2, 4)$.

(18) The perpendicular bisector of the line segment AB crosses the x axis at the point P . Given the coordinates of A are $(2, 1)$ and the coordinates of B are $(6, 4)$ find the coordinates of the point P .

(19) The lines $x + 3y - 4 = 0$ and $y = mx + 2$ are perpendicular. Find the value of m .

(20) Given the lines $px + y = 0$ and $2y = 3 + 5qx$ are parallel express p in terms of q .

(21) The line l passes through the point $(-1, 5)$ and is perpendicular to the line $2x + 4y + 7 = 0$. Line l meets the line $y = 3x + 8$ at the point P . Find the coordinates of P .