

COORDINATE GEOMETRY

- 1 Find the gradient of a straight line that is
 - a parallel to the line $y = 3 - 2x$,
 - b parallel to the line $2x - 5y + 1 = 0$,
 - c perpendicular to the line $y = 3x + 4$,
 - d perpendicular to the line $x + 2y - 3 = 0$.

- 2 Find, in the form $y = mx + c$, the equation of the straight line
 - a parallel to the line $y = 4x - 1$ which passes through the point with coordinates $(1, 7)$,
 - b perpendicular to the line $y = 6 - x$ which passes through the point with coordinates $(-4, 3)$,
 - c perpendicular to the line $x - 3y = 0$ which passes through the point with coordinates $(-2, -2)$.

- 3 Find, in the form $ax + by + c = 0$, where a, b and c are integers, the equation of the straight line
 - a parallel to the line $2x - 3y + 5 = 0$ which passes through the point with coordinates $(3, -1)$,
 - b perpendicular to the line $3x + 4y = 1$ which passes through the point with coordinates $(2, 5)$,
 - c parallel to the line $3x + 5y = 6$ which passes through the point with coordinates $(-4, -7)$.

- 4 Find, in the form $ax + by + c = 0$, where a, b and c are integers, the equation of the perpendicular bisector of the line segment joining each pair of points.
 - a $(0, 4)$ and $(8, 0)$
 - b $(2, 7)$ and $(4, 1)$
 - c $(-3, -2)$ and $(9, 1)$

- 5 The vertices of a triangle are the points $A(-6, -3)$, $B(4, -1)$ and $C(3, 4)$.
 - a Find the gradient of AB and the gradient of BC .
 - b Show that $\angle ABC = 90^\circ$.

- 6 The line with equation $2x - 3y + 5 = 0$ is perpendicular to the line with equation $3x + ky - 1 = 0$. Find the value of the constant k .

- 7 The straight line l passes through the points $A(-5, 5)$ and $B(1, 7)$.
 - a Find an equation of the line l . Give your answer in the form $ax + by + c = 0$, where a, b and c are integers.
The point M is the mid-point of AB .
 - b Prove that the line OM , where O is the origin, is perpendicular to line l .

- 8 The straight line p has the equation $3x - 4y + 8 = 0$.
The straight line q is parallel to p and passes through the point with coordinates $(8, 5)$.
 - a Find the equation of q in the form $y = mx + c$.
The straight line r is perpendicular to p and passes through the point with coordinates $(-4, 6)$.
 - b Find the equation of r in the form $ax + by + c = 0$, where a, b and c are integers.
 - c Find the coordinates of the point where lines q and r intersect.

- 9 The straight line l_1 passes through the points with coordinates $(-3, 7)$ and $(1, -5)$.
 - a Find an equation of the line l_1 in the form $ax + by + c = 0$, where a, b and c are integers.
The line l_2 is perpendicular to l_1 and passes through the point with coordinates $(4, 6)$.
 - b Find, in the form $k\sqrt{5}$, the distance from the origin of the point where l_1 and l_2 intersect.