

- 1 Given  $P(1, 5)$ ,  $Q(5, 7)$ ,  $R(3, 1)$ :
- Show that triangle PQR is isosceles.
  - Find the midpoint M of QR.
  - Use gradients to verify that PM is perpendicular to QR.

- 2) Given  $A(6, 8)$ ,  $B(14, 6)$ ,  $C(-1, -3)$  and  $D(-9, -1)$ :
- Use gradients to show that:
    - AB is parallel to DC
    - BC is parallel to AD.
  - What kind of figure is ABCD?
  - Check that  $AB = DC$  and  $BC = AD$  using the distance formula.
  - Find the midpoints of diagonals:
    - AC
    - BD.

- 3) Given  $A(1, 3)$ ,  $B(6, 3)$ ,  $C(3, -1)$  and  $D(-2, -1)$ :
- show that ABCD is a rhombus, using the distance formula
  - find the midpoints of AC and BD
  - show that AC and BD are perpendicular, using gradients.

- 4) (a) Complete the table of values for  $y = 1 + 2x - x^2$ .

$x$	-3	-2	-1	0	1	2	3	4	5
$y$	-14	-7				1	-2		-14

- (b) Draw the graph of  $y = 1 + 2x - x^2$

- 5) Find  $t$  given that the line joining:

- $A(2, -3)$  to  $B(-2, t)$  is perpendicular to a line with slope  $1\frac{1}{4}$
- $C(t, -2)$  to  $D(1, 4)$  is perpendicular to a line with slope  $\frac{2}{3}$
- $P(t, -2)$  to  $Q(5, t)$  is perpendicular to a line with slope  $-\frac{1}{4}$

- 6) Given  $A(-1, 1)$ ,  $B(1, 5)$  and  $C(5, 1)$ , where M is the midpoint of AB and N is the midpoint of BC:

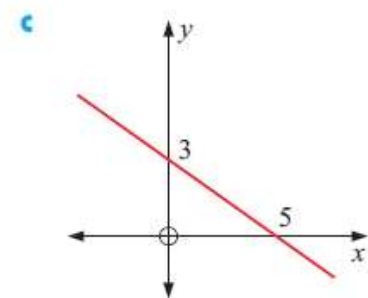
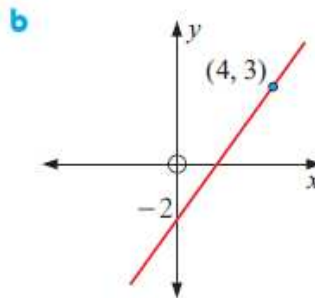
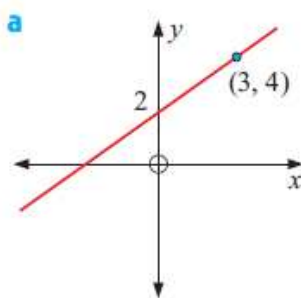
- show that MN is parallel to AC, using gradients
- show that MN is half the length of AC.

- 7) Given A(1, 3), B(6, 3), C(3, -1) and D(-2, -1):
- show that ABCD is a rhombus, using the distance formula
  - find the midpoints of AC and BD
  - show that AC and BD are perpendicular, using gradients.

8) Find the equation of the line:

- which has gradient  $\frac{1}{2}$ , and cuts the y-axis at 3
- which is parallel to a line with slope 2, and passes through the point (-1, 4)

9) Find the equations of the illustrated lines:



- 10)
  - Find the midpoint of the line segment joining A(2, 3) to B(4, 3).
  - Find the distance from C(3, 2) to D(0, 5).
  - Find the equation of the x-axis.
  - Find the gradient of all lines perpendicular to a line with slope  $\frac{2}{3}$ .
  - Write down the gradient and y-intercept of the line with equation  $y = 5 - 2x$ .

11) Find k if:

- (2, 5) lies on the line with equation  $3x - 2y = k$
- (-1, 3) lies on the line with equation  $5x + 2y = k$ .

12) Find a given that:

- (a, 3) lies on the line with equation  $y = 2x - 11$
- (a, 5) lies on the line with equation  $y = 4 - x$
- (4, a) lies on the line with equation  $y = \frac{1}{2}x + 3$
- (-2, a) lies on the line with equation  $y = 1 - 3x$

13) Use graphical methods to find the point of intersection of:

**a**  $y = x + 3$   
 $y = 1 - x$

**b**  $x + y = 6$   
 $y = 2x$

**c**  $4x + 3y = 15$   
 $x - 2y = 1$

**d**  $3x + y = -3$   
 $2x - 3y = -13$

**e**  $3x + y = 6$   
 $3x - 2y = -12$

**f**  $x - 3y = -9$   
 $2x - 3y = -8$

**g**  $2x - y = 3$   
 $x + 2y = 4$

**h**  $y = 2x - 3$   
 $2x - y = 2$

**i**  $y = -x - 3$   
 $2x + 2y = -6$

**Coordinate Geometry  
Question Bank**

- 14) Find the equation of the vertical line through  $(-1, 5)$ .
- 15) Find the distance between the points  $S(7, -2)$  and  $T(-1, 1)$ .
- 16) Given  $P(-3, 2)$  and  $Q(3, -1)$ , find the midpoint of  $PQ$ .
- 17) Find the gradient of the line perpendicular to a line with gradient  $-\frac{1}{2}$ .
- 18) Find the  $y$ -intercept for the line  $4x - 3y = -9$ .
- 19) Determine the gradient of the line with equation  $4x + 5y = 11$ .
- 20) Find the axis intercepts and gradient of the line with equation  $2x + 3y = 6$ .
- 21) If  $X(-2, 3)$  and  $Y(a, -1)$  are 6 units apart, find the value of  $a$ .