Solutions

Marking: **M1** a correct method, **A1** the correct answer.

Each answer shows the steps, then the **result**.

2.1

- differences are 6 across and 8 up, so $AB = \sqrt{6^2 + 8^2} = \sqrt{36 + 64}$

$$= \sqrt{100} = \mathbf{10}$$

2.2

- average each coordinate: $\left(\dfrac{1+7}{2},\ \dfrac{2+10}{2}\right)$

$$= (\mathbf{4},\ \mathbf{6})$$

2.3

- differences are 5 and -12, so $PQ = \sqrt{5^2 + (-12)^2} = \sqrt{25 + 144}$

$$= \sqrt{169} = \mathbf{13}$$

2.4

- midpoint $= \left(\dfrac{-4+6}{2},\ \dfrac{7+(-3)}{2}\right) = (\mathbf{1},\ \mathbf{2})$

2.5

- length $= \sqrt{(\Delta x)^2 + (\Delta y)^2} = \sqrt{5^2 + 12^2} = \sqrt{169}$

$$= \mathbf{13}$$

3.1

(a)

- $\left(\dfrac{-2+4}{2},\ \dfrac{1+6}{2}\right)$

$$= (\mathbf{1},\ \mathbf{3.5})$$

(b)

- differences are 6 and 5
- $AB = \sqrt{36 + 25}$

$$= \sqrt{\mathbf{61}}$$

- 61 has no square factor, so $\sqrt{61}$ is already the exact form; a decimal would lose the mark

3.2

- the midpoint is the average, so $\dfrac{-1 + x_Q}{2} = 3$ and $\dfrac{4 + y_Q}{2} = -1$
- $x_Q = 6 - (-1) = 7$ and $y_Q = -2 - 4 = -6$

$$Q = (\mathbf{7},\ \mathbf{-6})$$

3.3

- $AC = \sqrt{(4-1)^2 + (5-1)^2} = \sqrt{9 + 16} = 5$
- $BC = \sqrt{(4-7)^2 + (5-1)^2} = \sqrt{9 + 16} = 5$
- $AC = BC$, so the triangle is **isosceles**

3.4

- $(5-2)^2 + (1-k)^2 = 5^2$, so $9 + (k-1)^2 = 25$
- $(k-1)^2 = 16$, so $k - 1 = 4$ or -4

$$k = \mathbf{5} \text{ or } k = \mathbf{-3}$$

3.5

- the centre is the midpoint: $\left(\dfrac{-1+7}{2},\ \dfrac{2+8}{2}\right) = (\mathbf{3},\ \mathbf{5})$
- diameter $= \sqrt{8^2 + 6^2} = \sqrt{100} = 10$
- radius $= 10 \div 2 = \mathbf{5}$