

Solutions

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

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

2.1

- midpoint = $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

$$\left(\frac{2+6}{2}, \frac{3+9}{2}\right) = (4, 6)$$

2.2

$$\sqrt{3^2 + 4^2} = \sqrt{25} = 5$$

2.3

- 3 left and 2 up from the origin: $(-3, 2)$

2.4

$$\frac{7 - (-1)}{6 - 2} = \frac{8}{4} = 2$$

2.5

- negative reciprocal of $\frac{2}{5}$ is $-\frac{5}{2}$

2.6

$$\sqrt{9^2 + 12^2} = \sqrt{81 + 144} = \sqrt{225} = 15$$

3.1

(a)

$$\left(\frac{1+7}{2}, \frac{1+9}{2}\right) = (4, 5)$$

(b)

$$\sqrt{(7-1)^2 + (9-1)^2} = \sqrt{36 + 64} = \sqrt{100} = 10$$

3.2

- $Q = (2 \times 3 - 1, 2 \times 5 - 2)$
- $(5, 8)$

3.3

(a)

$$\left(\frac{-2+6}{2}, \frac{3+9}{2}\right) = (2, 6)$$

(b)

$$\sqrt{(6 - (-2))^2 + (9 - 3)^2} = \sqrt{8^2 + 6^2} = \sqrt{100} = 10$$

(c)

$$\frac{9-3}{6-(-2)} = \frac{6}{8} = \frac{3}{4}$$

(d)

- $y - 3 = \frac{3}{4}(x + 2)$
- $y = \frac{3}{4}x + \frac{3}{2} + 3$
- $y = \frac{3}{4}x + 4.5$

(e)

- perpendicular gradient = $-\frac{4}{3}$
- through $(2, 6)$: $y - 6 = -\frac{4}{3}(x - 2)$
- $y = -\frac{4}{3}x + \frac{26}{3}$