

## Solutions

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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)

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

(b)

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

(c)

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

(d)

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

(e)

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