

1.7 Answers

1.7.1 Solutions (1.1.2 Exercise)

$$\mathbf{b} = \begin{pmatrix} -6 \\ 2 \end{pmatrix} \qquad \mathbf{b} = -6\mathbf{i} + 2\mathbf{j}$$

$$\mathbf{c} = \begin{pmatrix} -6 \\ 0 \end{pmatrix} \qquad \mathbf{c} = -6\mathbf{i}$$

[4 marks]

1.7.2 Solutions (1.2.2 Exercise)

$$\mathbf{m} = 5 \begin{pmatrix} 4 \\ 11 \end{pmatrix} \qquad \mathbf{n} = 4(3\mathbf{i} + 2\mathbf{j})$$

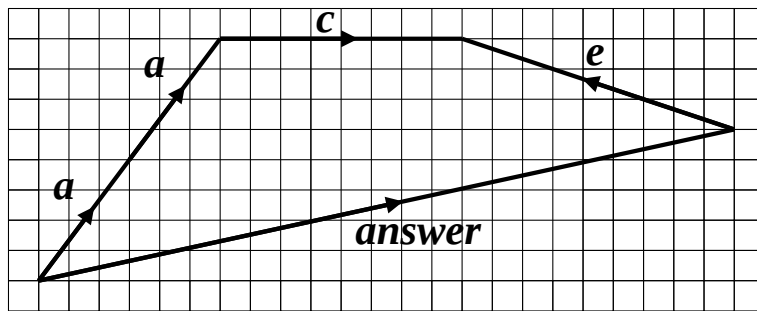
[2 marks]

1.7.3 Solutions (1.3.2 Exercise)

$$\mathbf{a} = 6 \begin{pmatrix} 2 \\ 3 \end{pmatrix} \qquad \mathbf{z} = 8 \begin{pmatrix} 2 \\ 3 \end{pmatrix} \qquad \text{Same direction, } \therefore \text{parallel } \square$$

[3 marks]

1.7.4 Solution (1.4.1 Example)



Vectors $\mathbf{a}$, $\mathbf{a}$ and $\mathbf{c}$ are joined "head to tail" then add on $\mathbf{e}$ having reversed it first. From the start to the finish is now the answer vector.

[1 mark]

1.7.5 Solutions (1.4.2 Exercise)

$$\begin{aligned} \mathbf{a} + 2\mathbf{c} - \mathbf{e} &= \begin{pmatrix} 3 \\ 4 \end{pmatrix} + 2\begin{pmatrix} 8 \\ 0 \end{pmatrix} - \begin{pmatrix} -9 \\ 3 \end{pmatrix} \\ &= \begin{pmatrix} 3 \\ 4 \end{pmatrix} + \begin{pmatrix} 16 \\ 0 \end{pmatrix} + \begin{pmatrix} 9 \\ -3 \end{pmatrix} \\ &= \begin{pmatrix} 28 \\ 1 \end{pmatrix} \end{aligned}$$

[3 marks]

1.7.6 Solutions (1.5.2 Exercise)

$$\mathbf{p} = \begin{pmatrix} 6 \\ 11 \end{pmatrix} \Rightarrow |\mathbf{p}| = \sqrt{6^2 + 11^2} = \sqrt{36 + 121} = \sqrt{157}$$

[2 marks]

1.7.8 Solutions (1.6 Exercise)

Answer 1

$$\mathbf{a} = \begin{pmatrix} 6 \\ 2 \end{pmatrix} \quad \mathbf{b} = \begin{pmatrix} -9 \\ 3 \end{pmatrix} \quad \mathbf{c} = \begin{pmatrix} 0 \\ -3 \end{pmatrix}$$

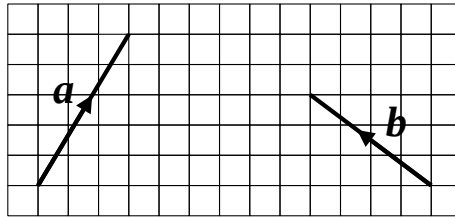
[3 marks]

Answer 2

$$\mathbf{d} = -12\mathbf{i} - \mathbf{j} \quad \mathbf{e} = 3\mathbf{i} - \mathbf{j} \quad \mathbf{f} = 6\mathbf{i}$$

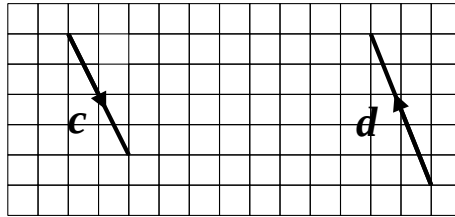
[3 marks]

Answer 3



[2 marks]

Answer 4



[2 marks]

Answer 5

$$\mathbf{p} = 11 \begin{pmatrix} 2 \\ 7 \end{pmatrix} \quad \mathbf{q} = 4 \begin{pmatrix} 5 \\ 6 \end{pmatrix}$$

[2 marks]

Answer 6

$$\mathbf{y} = 3 \begin{pmatrix} 5 \\ 4 \end{pmatrix} \quad \mathbf{z} = 7 \begin{pmatrix} 5 \\ 4 \end{pmatrix} \quad \text{Same direction, } \therefore \text{parallel } \square$$

[2 marks]

Answer 7

$$\mathbf{c} = 3(4\mathbf{i} + 5\mathbf{j}) \quad \mathbf{v} = 7(4\mathbf{i} + 5\mathbf{j}) \quad \text{Same direction, } \therefore \text{parallel } \square$$

[2 marks]

Answer 8

$$\sqrt{145} \quad (12.04)$$

Answer 9

$$\sqrt{74} \quad (8.60)$$

[2, 2 marks]

Answer 10

$$(i) \quad \begin{pmatrix} 5 \\ 10 \end{pmatrix} \quad (ii) \quad \begin{pmatrix} 18 \\ 24 \end{pmatrix} \quad (iii) \quad \begin{pmatrix} 12 \\ 24 \end{pmatrix}$$

[1, 2, 2 marks]

Answer 11

$$\begin{array}{lll} \text{(i)} & \text{(a)} & \begin{pmatrix} 4 \\ 4 \end{pmatrix} & \text{(b)} & \begin{pmatrix} 1 \\ 1 \end{pmatrix} & \text{(c)} & \begin{pmatrix} -1 \\ -1 \end{pmatrix} \\ \text{(ii)} & \text{(a)} & \begin{pmatrix} 6 \\ -4 \end{pmatrix} & \text{(b)} & \begin{pmatrix} 3 \\ -2 \end{pmatrix} & \text{(c)} & \begin{pmatrix} -3 \\ 2 \end{pmatrix} \end{array}$$

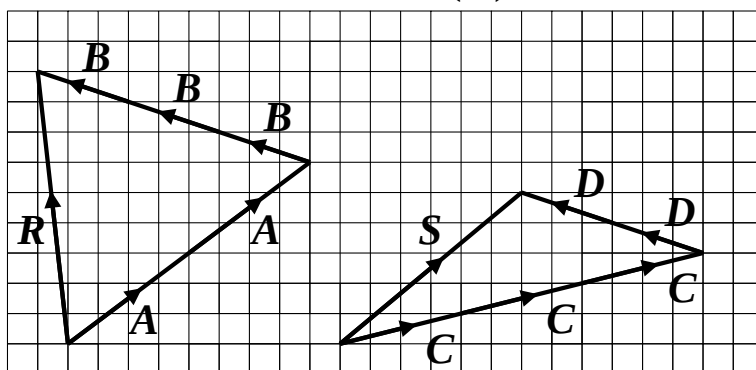
[6 marks]

Answer 12

$$\begin{array}{l} \text{(i)} \quad \begin{pmatrix} -1 \\ 9 \end{pmatrix} \\ \text{(ii)} \end{array}$$

Answer 13

$$\begin{array}{l} \text{(i)} \quad \begin{pmatrix} 6 \\ 5 \end{pmatrix} \\ \text{(ii)} \end{array}$$



[3, 3 marks]

Answer 14

$$\begin{array}{lll} \text{(i)} & \begin{pmatrix} -19 \\ -1 \end{pmatrix} & \text{(ii)} \quad \begin{pmatrix} 4 \\ -11 \end{pmatrix} & \text{(iii)} & \begin{pmatrix} -12 \\ 11 \end{pmatrix} \end{array}$$

[2, 2, 2 marks]

Answer 15

$$\begin{array}{ll} \text{(a)} & \begin{pmatrix} 4 \\ 8 \end{pmatrix} & \text{(b)} & 4a + 8b \end{array}$$

[1, 1 mark]

Answer 16

$$b = 15 \begin{pmatrix} 3 \\ 1 \end{pmatrix} \quad t = 12 \begin{pmatrix} 3 \\ 1 \end{pmatrix} \quad \text{Same direction, } \therefore \text{parallel} \quad \square$$

[2 marks]

Answer 17

$$\begin{aligned} |R| &= \sqrt{13^2 + 16^2} = \sqrt{169 + 256} = \sqrt{425} = \sqrt{25 \times 17} \\ &= \sqrt{25} \times \sqrt{17} = 5\sqrt{17} \quad \square \end{aligned}$$

[1 mark]

Answer 18

6

Answer 19

Various !

[1, 1 mark]