Add and subtract two column vectors to give a resultant vector

Miss Davies

Maths

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Add and subtract two column vectors to give a resultant vector

1. If $\mathbf{a} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} 4 \\ 2 \end{pmatrix}$ $\mathbf{c} = \begin{pmatrix} -3 \\ -2 \end{pmatrix}$ $\mathbf{d} = \begin{pmatrix} 0 \\ -2 \end{pmatrix}$

Find:

(a) $2\mathbf{a} + \mathbf{b}$ (b) $2\mathbf{a} - \mathbf{b}$ (c) $3\mathbf{a} + \mathbf{c}$

(d) $\mathbf{c} - 2\mathbf{b}$ (e) $2\mathbf{d} - \mathbf{c}$ (f) $2\mathbf{d} + \mathbf{c}$

(g) $2\mathbf{a} + 2\mathbf{b} + 2\mathbf{c}$ (h) $3\mathbf{d} + 2\mathbf{b} - \mathbf{c}$

2. Jilly has worked out the resultant vector for $2\mathbf{e} - 3\mathbf{f}$ below.
She has made two mistakes.
Find and correct the mistakes.

$$\mathbf{e} = \begin{pmatrix} 1 \\ 3 \end{pmatrix} \quad \mathbf{f} = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$$

$$2\mathbf{e} - 3\mathbf{f} = 2\begin{pmatrix} 1 \\ 3 \end{pmatrix} - 3\begin{pmatrix} -2 \\ 3 \end{pmatrix}$$

$$= \begin{pmatrix} 2 \\ 3 \end{pmatrix} - \begin{pmatrix} -6 \\ 3 \end{pmatrix}$$

$$= \begin{pmatrix} 8 \\ 0 \end{pmatrix}$$

Answers

Add and subtract two column vectors to give a resultant vector

1. If $\mathbf{a} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} 4 \\ 2 \end{pmatrix}$ $\mathbf{c} = \begin{pmatrix} -3 \\ -2 \end{pmatrix}$ $\mathbf{d} = \begin{pmatrix} 0 \\ -2 \end{pmatrix}$

Find:

(a) 2**a** + **b**

(b) 2**a** − **b** $\begin{pmatrix} 4 \\ 0 \end{pmatrix}$

(c) 3**a** + **c** $\begin{pmatrix} 9 \\ 1 \end{pmatrix}$

$\begin{pmatrix} 12 \\ 4 \end{pmatrix}$

(d) **c** − 2**b** $\begin{pmatrix} -11 \\ -6 \end{pmatrix}$

(e) 2**d** − **c** $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$

(f) 2**d** + **c** $\begin{pmatrix} -3 \\ -6 \end{pmatrix}$

(g) 2**a** + 2**b** + 2**c** $\begin{pmatrix} 10 \\ 2 \end{pmatrix}$

(h) 3**d** + 2**b** − **c** $\begin{pmatrix} 11 \\ 0 \end{pmatrix}$

2. Jilly has worked out the resultant vector for 2**e** − 3**f** below.
She has made two mistakes.
Find and correct the mistakes.

$\mathbf{e} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$ $\mathbf{f} = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$

$$2\mathbf{e} - 3\mathbf{f} = 2\begin{pmatrix} 1 \\ 3 \end{pmatrix} - 3\begin{pmatrix} -2 \\ 3 \end{pmatrix}$$

$$= \begin{pmatrix} 2 \\ 6 \end{pmatrix} - \begin{pmatrix} -6 \\ 9 \end{pmatrix}$$

$$= \begin{pmatrix} 8 \\ -3 \end{pmatrix}$$