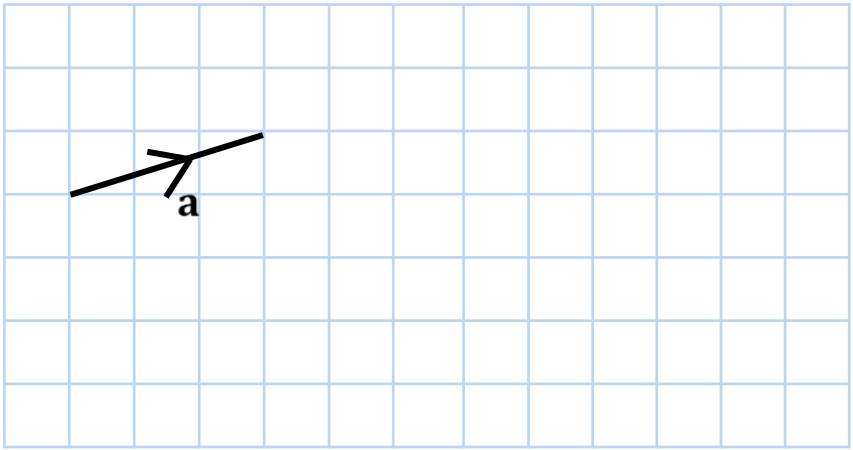
Multiply a vector by a scalar

Maths

Miss Davies

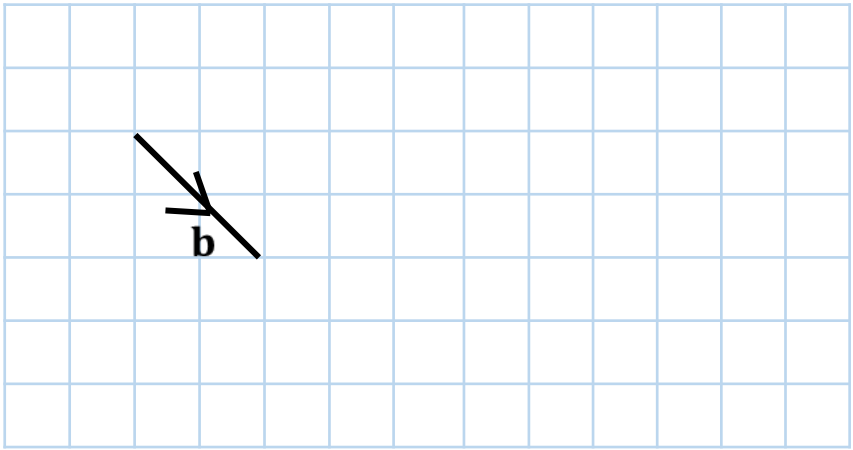
Multiply a vector by a scalar

1. a) $\mathbf{a} = \begin{pmatrix} 3 \\ 1 \end{pmatrix}$. Draw 2**a** and 3**a** on this grid.



b) Write the column vectors for 2**a** and 3**a**.

2. a) $\mathbf{b} = \begin{pmatrix} 2 \\ -2 \end{pmatrix}$. Draw 2**b** and -**b** on this grid.



b) Write the column vectors for 2**b** and -**b**.

Multiply a vector by a scalar

3. $\mathbf{u} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$ and $\mathbf{v} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$

Write as column vectors.

a) $3\mathbf{u}$ b) $2\mathbf{v}$ c) $-\mathbf{u}$ d) $-3\mathbf{v}$

4. $\mathbf{s} = \begin{pmatrix} 0 \\ 2 \end{pmatrix}$ and $\mathbf{t} = \begin{pmatrix} 4 \\ -2 \end{pmatrix}$

Write as column vectors.

a) $3\mathbf{s}$ b) $2\mathbf{t}$ c) $-4\mathbf{s}$ d) $-2\mathbf{t}$

5. Given that,

$3\mathbf{a} = \begin{pmatrix} 12 \\ 9 \end{pmatrix}$, $4\mathbf{b} = \begin{pmatrix} -4 \\ -8 \end{pmatrix}$ and $2\mathbf{c} = \begin{pmatrix} -10 \\ 2 \end{pmatrix}$

Give these as column vectors

a) $\mathbf{a}$ b) $\mathbf{b}$ c) $5\mathbf{c}$ d) $-\mathbf{c}$

6. Given that, $\mathbf{e} = \begin{pmatrix} 4 \\ 9 \end{pmatrix}$ and $\mathbf{f} = \begin{pmatrix} -10 \\ 2 \end{pmatrix}$

Write as column vectors.

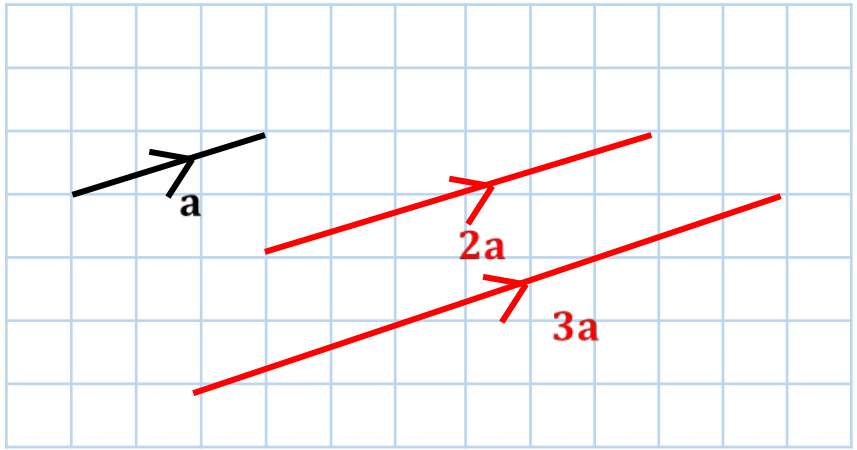
a) A vector twice as long as f and in the same direction

b) A vector the same length as e but in the opposite direction.

Answers

Multiply a vector by a scalar

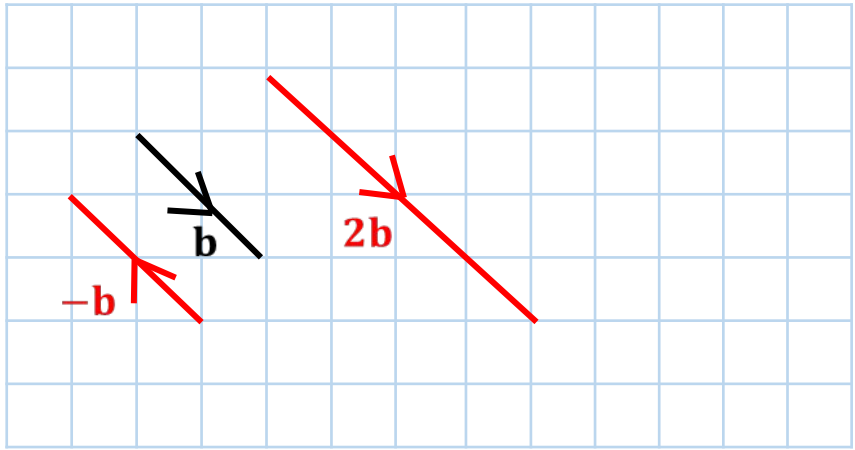
1. a) $\mathbf{a} = \begin{pmatrix} 3 \\ 1 \end{pmatrix}$. Draw $2\mathbf{a}$ and $3\mathbf{a}$ on this grid.



b) Write the column vectors for $2\mathbf{a}$ and $3\mathbf{a}$.

$2\mathbf{a} = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$ $3\mathbf{a} = \begin{pmatrix} 9 \\ 3 \end{pmatrix}$

2. a) $\mathbf{b} = \begin{pmatrix} 2 \\ -2 \end{pmatrix}$. Draw $2\mathbf{b}$ and $-\mathbf{b}$ on this grid.



b) Write the column vectors for $2\mathbf{b}$ and $-\mathbf{b}$.

$2\mathbf{b} = \begin{pmatrix} 4 \\ -4 \end{pmatrix}$ $-\mathbf{b} = \begin{pmatrix} -2 \\ 2 \end{pmatrix}$

Multiply a vector by a scalar

3. $\mathbf{u} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$ and $\mathbf{v} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$

Write as column vectors.

a) $3\mathbf{u}$ b) $2\mathbf{v}$ c) $-\mathbf{u}$ d) $-3\mathbf{v}$

$3\mathbf{u} = \begin{pmatrix} 9 \\ 6 \end{pmatrix}$ $2\mathbf{v} = \begin{pmatrix} -6 \\ 8 \end{pmatrix}$ $-\mathbf{u} = \begin{pmatrix} -3 \\ -2 \end{pmatrix}$ $-3\mathbf{v} = \begin{pmatrix} 9 \\ -12 \end{pmatrix}$

4. $\mathbf{s} = \begin{pmatrix} 0 \\ 2 \end{pmatrix}$ and $\mathbf{t} = \begin{pmatrix} 4 \\ -2 \end{pmatrix}$

Write as column vectors.

a) $3\mathbf{s}$ b) $2\mathbf{t}$ c) $-4\mathbf{s}$ d) $-2\mathbf{t}$

$3\mathbf{s} = \begin{pmatrix} 0 \\ 6 \end{pmatrix}$ $2\mathbf{t} = \begin{pmatrix} 8 \\ -4 \end{pmatrix}$ $-4\mathbf{s} = \begin{pmatrix} 0 \\ -8 \end{pmatrix}$ $-2\mathbf{t} = \begin{pmatrix} -8 \\ 4 \end{pmatrix}$

5. Given that,

$3\mathbf{a} = \begin{pmatrix} 12 \\ 9 \end{pmatrix}$, $4\mathbf{b} = \begin{pmatrix} -4 \\ -8 \end{pmatrix}$ and $2\mathbf{c} = \begin{pmatrix} -10 \\ 2 \end{pmatrix}$

Give these as column vectors

a) $\mathbf{a} = \begin{pmatrix} 4 \\ 3 \end{pmatrix}$ b) $\mathbf{b} = \begin{pmatrix} -1 \\ -2 \end{pmatrix}$ c) $5\mathbf{c} = \begin{pmatrix} -25 \\ 5 \end{pmatrix}$ d) $-\mathbf{c} = \begin{pmatrix} 5 \\ -1 \end{pmatrix}$

6. Given that, $\mathbf{e} = \begin{pmatrix} 4 \\ 9 \end{pmatrix}$ and $\mathbf{f} = \begin{pmatrix} -10 \\ 2 \end{pmatrix}$

Write as column vectors.

a) A vector twice as long as f and in the same direction $\begin{pmatrix} -20 \\ 4 \end{pmatrix}$

b) A vector the same length as e but in the opposite direction. $\begin{pmatrix} -4 \\ -9 \end{pmatrix}$