

a)

Vector $\mathbf{m} = \begin{pmatrix} 2 \\ k \end{pmatrix}$ and vector $\mathbf{n} = \begin{pmatrix} 3 \\ 11 \end{pmatrix}$.

Vector $2\mathbf{m} + \mathbf{n}$ is parallel to $\begin{pmatrix} 1 \\ -1 \end{pmatrix}$.

Find the value of k.

What is the vector $2\mathbf{m}$?	$2\mathbf{m} = \begin{pmatrix} 4 \\ 2k \end{pmatrix}$
What is the vector $2\mathbf{m} + \mathbf{n}$?	$2\mathbf{m} + \mathbf{n} = \begin{pmatrix} 4 + 3 \\ 2k + 11 \end{pmatrix} = \begin{pmatrix} 7 \\ 2k + 11 \end{pmatrix}$
If $2\mathbf{m} + \mathbf{n}$ is parallel to $\begin{pmatrix} 1 \\ -1 \end{pmatrix}$, what is the multiplier so that the changes in the x-direction are equal?	$\begin{pmatrix} 1 \\ -1 \end{pmatrix} \times 7 = \begin{pmatrix} 7 \\ -7 \end{pmatrix}$
How can we form an equation using the changes in the y-direction?	$\begin{pmatrix} 7 \\ -7 \end{pmatrix} = \begin{pmatrix} 7 \\ 2k + 11 \end{pmatrix}$ $2k + 11 = -7$
What is the value of k?	$2k + 11 = -7$ $2k = -18$ $k = -9$

b)

Vector $\mathbf{m} = \begin{pmatrix} 8 \\ k \end{pmatrix}$ and vector $\mathbf{n} = \begin{pmatrix} -4 \\ 6 \end{pmatrix}$.

Vector $2\mathbf{m} + \mathbf{n}$ is parallel to $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$.

Find the value of k.

What is the vector $2\mathbf{m}$?	$2\mathbf{m} = \begin{pmatrix} 16 \\ 2k \end{pmatrix}$
What is the vector $2\mathbf{m} + \mathbf{n}$?	$2\mathbf{m} + \mathbf{n} = \begin{pmatrix} 16 + (-4) \\ 2k + 6 \end{pmatrix} = \begin{pmatrix} 12 \\ 2k + 6 \end{pmatrix}$
If $2\mathbf{m} + \mathbf{n}$ is parallel to $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$, what is the multiplier so that the changes in the x-direction are equal?	$\begin{pmatrix} 3 \\ -2 \end{pmatrix} \times 4 = \begin{pmatrix} 12 \\ -8 \end{pmatrix}$
How can we form an equation using the changes in the y-direction?	
What is the value of k?	

c)

Vector $\mathbf{m} = \begin{pmatrix} k \\ 3 \end{pmatrix}$ and vector $\mathbf{n} = \begin{pmatrix} -3 \\ 6 \end{pmatrix}$.

Vector $3\mathbf{m} - \mathbf{n}$ is parallel to $\begin{pmatrix} 4 \\ 1 \end{pmatrix}$.

Find the value of k.

What is the vector $3\mathbf{m}$?	$3\mathbf{m} = \begin{pmatrix} 3k \\ 9 \end{pmatrix}$
What is the vector $3\mathbf{m} - \mathbf{n}$?	$3\mathbf{m} - \mathbf{n} = \begin{pmatrix} 3k - (-3) \\ 9 - 6 \end{pmatrix} = \begin{pmatrix} 3k + 3 \\ 3 \end{pmatrix}$
If $3\mathbf{m} - \mathbf{n}$ is parallel to $\begin{pmatrix} 4 \\ 1 \end{pmatrix}$, what is the multiplier so that the changes in the y-direction are equal?	
How can we form an equation using the changes in the x-direction?	
What is the value of k?	

d)

Vector $\mathbf{m} = \begin{pmatrix} 2 \\ k \end{pmatrix}$ and vector $\mathbf{n} = \begin{pmatrix} 4 \\ -5 \end{pmatrix}$.

Vector $\mathbf{m} - 2\mathbf{n}$ is parallel to $\begin{pmatrix} -2 \\ 5 \end{pmatrix}$.

Find the value of k.