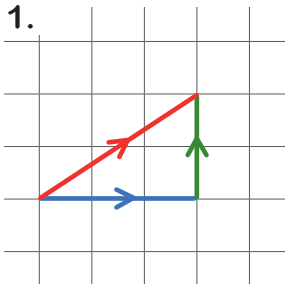
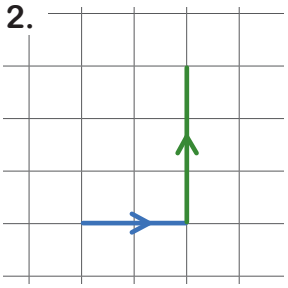
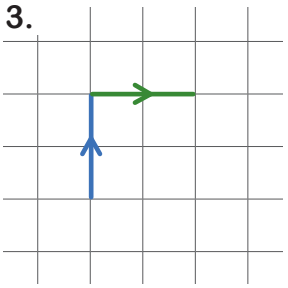
Column Vector Addition

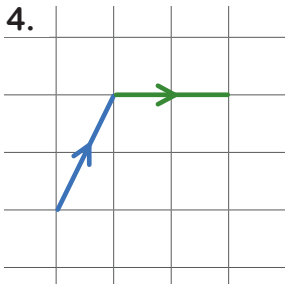
Section A *The diagrams show the sum of two vectors. Write the resultant column vector.*

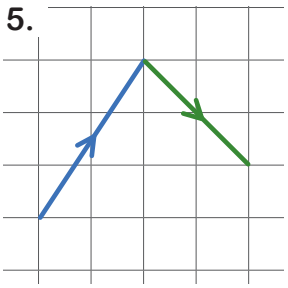
Example:

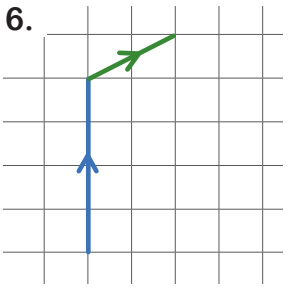
1.  $\begin{pmatrix}3\\2\end{pmatrix}$

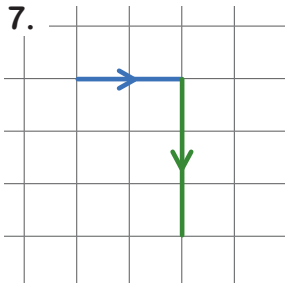
2. 

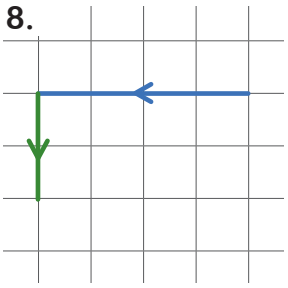
3. 

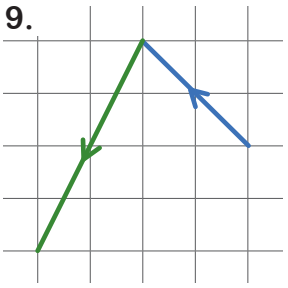
4. 

5. 

6. 

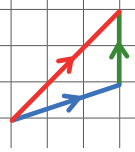
7. 

8. 

9. 

Section B *Draw a diagram to show the resultant of the two vectors.*

Example:

1. $\begin{pmatrix}3\\1\end{pmatrix} + \begin{pmatrix}0\\2\end{pmatrix} = \begin{pmatrix}3\\3\end{pmatrix}$ 

2. $\begin{pmatrix}1\\3\end{pmatrix} + \begin{pmatrix}1\\1\end{pmatrix} =$

3. $\begin{pmatrix}0\\2\end{pmatrix} + \begin{pmatrix}2\\2\end{pmatrix} =$

4. $\begin{pmatrix}4\\1\end{pmatrix} + \begin{pmatrix}-3\\2\end{pmatrix} =$

5. $\begin{pmatrix}-2\\-2\end{pmatrix} + \begin{pmatrix}3\\-1\end{pmatrix} =$

6. $\begin{pmatrix}2\\-3\end{pmatrix} + \begin{pmatrix}-2\\1\end{pmatrix} =$

Column Vector Addition

Section C

Find the resultant vectors of these vector additions.

Example: 1. $\begin{pmatrix}3\\5\end{pmatrix}+\begin{pmatrix}4\\3\end{pmatrix}=\begin{pmatrix}7\\8\end{pmatrix}$

2. $\begin{pmatrix}3\\4\end{pmatrix}+\begin{pmatrix}3\\5\end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

3. $\begin{pmatrix}5\\4\end{pmatrix}+\begin{pmatrix}3\\3\end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

4. $\begin{pmatrix}5\\-4\end{pmatrix}+\begin{pmatrix}-3\\3\end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

5. $\begin{pmatrix}-3\\4\end{pmatrix}+\begin{pmatrix}3\\-5\end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

6. $\begin{pmatrix}-5\\-3\end{pmatrix}+\begin{pmatrix}-4\\-3\end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

7. $\begin{pmatrix}15\\3\end{pmatrix}+\begin{pmatrix}4\\-13\end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

8. $\begin{pmatrix}-15\\8\end{pmatrix}+\begin{pmatrix}7\\4\end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

9. $\begin{pmatrix}-7\\-5\end{pmatrix}+\begin{pmatrix}-8\\-13\end{pmatrix}+\begin{pmatrix}2\\6\end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

Section D

Multiplying a vector by a number gives a parallel vector. Write the parallel vector.

Example: 1. $\mathbf{a}=\begin{pmatrix}3\\5\end{pmatrix}$ $2\mathbf{a}=2\begin{pmatrix}3\\5\end{pmatrix}=\begin{pmatrix}6\\10\end{pmatrix}$

2. $\mathbf{b}=\begin{pmatrix}4\\2\end{pmatrix}$ $3\mathbf{b}=3\begin{pmatrix}4\\2\end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

3. $\mathbf{c}=\begin{pmatrix}5\\7\end{pmatrix}$ $2\mathbf{c}=\ldots\ldots\begin{pmatrix}\ \\\ \end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

4. $\mathbf{d}=\begin{pmatrix}-2\\3\end{pmatrix}$ $4\mathbf{d}=\ldots\ldots\begin{pmatrix}\ \\\ \end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

5. $\mathbf{e}=\begin{pmatrix}8\\-1\end{pmatrix}$ $5\mathbf{e}=\ldots\ldots\begin{pmatrix}\ \\\ \end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

6. $\mathbf{f}=\begin{pmatrix}-4\\-6\end{pmatrix}$ $1.5\mathbf{f}=\begin{pmatrix}\ \\\ \end{pmatrix}$

7. $\mathbf{g}=\begin{pmatrix}2\\5\end{pmatrix}$ $-\mathbf{g}=-1\begin{pmatrix}2\\5\end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

8. $\mathbf{h}=\begin{pmatrix}-3\\6\end{pmatrix}$ $-3\mathbf{h}=\begin{pmatrix}\ \\\ \end{pmatrix}$

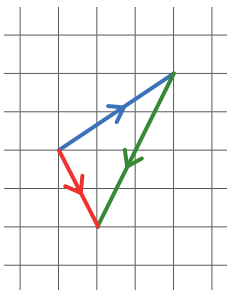
9. $\mathbf{k}=\begin{pmatrix}8\\-6\end{pmatrix}$ $-2.5\mathbf{k}=\begin{pmatrix}\ \\\ \end{pmatrix}$

Section E

Subtracting a vector is the same as adding the negative vector. Draw a diagram to show the subtractions.

Example: 1. $\mathbf{a}=\begin{pmatrix}3\\2\end{pmatrix}$ $\mathbf{b}=\begin{pmatrix}2\\4\end{pmatrix}$

$\mathbf{a}-\mathbf{b}=\mathbf{a}+(-\mathbf{b})=\begin{pmatrix}3\\2\end{pmatrix}+\begin{pmatrix}-2\\-4\end{pmatrix}=\begin{pmatrix}1\\-2\end{pmatrix}$



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

$\mathbf{a}-\mathbf{b}=\mathbf{a}+(-\mathbf{b})=\begin{pmatrix}\ \\\ \end{pmatrix}+\begin{pmatrix}\ \\\ \end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

3. $\mathbf{a}=\begin{pmatrix}-4\\-2\end{pmatrix}$ $\mathbf{b}=\begin{pmatrix}-2\\-3\end{pmatrix}$

$\mathbf{a}-\mathbf{b}=\mathbf{a}+(-\mathbf{b})=\begin{pmatrix}\ \\\ \end{pmatrix}+\begin{pmatrix}\ \\\ \end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

4. $\mathbf{a}=\begin{pmatrix}2\\-5\end{pmatrix}$ $\mathbf{b}=\begin{pmatrix}4\\-2\end{pmatrix}$

$\mathbf{a}-\mathbf{b}=\mathbf{a}+(-\mathbf{b})=\begin{pmatrix}\ \\\ \end{pmatrix}+\begin{pmatrix}\ \\\ \end{pmatrix}=\begin{pmatrix}\ \\\ \end{pmatrix}$

Column Vector Addition

Section F

Find the answer to these vector subtractions.

Example: 1. $\begin{pmatrix}6\\5\end{pmatrix} - \begin{pmatrix}4\\3\end{pmatrix} = \begin{pmatrix}2\\2\end{pmatrix}$	2. $\begin{pmatrix}7\\4\end{pmatrix} - \begin{pmatrix}2\\1\end{pmatrix} = \begin{pmatrix}\ \\\ \end{pmatrix}$	3. $\begin{pmatrix}4\\8\end{pmatrix} - \begin{pmatrix}5\\3\end{pmatrix} = \begin{pmatrix}\ \\\ \end{pmatrix}$
4. $\begin{pmatrix}9\\4\end{pmatrix} - \begin{pmatrix}5\\7\end{pmatrix} = \begin{pmatrix}\ \\\ \end{pmatrix}$	5. $\begin{pmatrix}7\\-4\end{pmatrix} - \begin{pmatrix}-2\\6\end{pmatrix} = \begin{pmatrix}\ \\\ \end{pmatrix}$	6. $\begin{pmatrix}-5\\7\end{pmatrix} - \begin{pmatrix}-3\\-8\end{pmatrix} = \begin{pmatrix}\ \\\ \end{pmatrix}$

Section G

Use the column vectors to find the answers to the mixed questions.

$\mathbf{a} = \begin{pmatrix}2\\3\end{pmatrix}$ $\mathbf{b} = \begin{pmatrix}-3\\4\end{pmatrix}$ $\mathbf{c} = \begin{pmatrix}1\\-5\end{pmatrix}$ $\mathbf{d} = \begin{pmatrix}-4\\-6\end{pmatrix}$ $\mathbf{e} = \begin{pmatrix}8\\-14\end{pmatrix}$

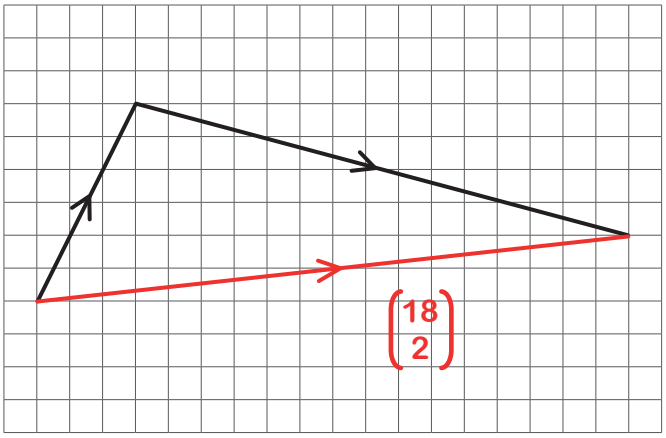
Example: 1. $\mathbf{a} + \mathbf{b} + \mathbf{c}$ $\begin{pmatrix}6\\5\end{pmatrix}$	2. $\mathbf{c} - \mathbf{d}$	3. $2\mathbf{a} + \mathbf{e}$
4. $3\mathbf{b} + 2\mathbf{d}$	5. $4\mathbf{c} - \mathbf{a}$	6. $0.5\mathbf{e} + 3\mathbf{b}$
7. $5\mathbf{a} - \mathbf{c} + 1.5\mathbf{d}$	8. $10\mathbf{d} + 5\mathbf{b} - 3\mathbf{e}$	9. $\mathbf{a} + \mathbf{b} + \mathbf{c} - \mathbf{d} - \mathbf{e}$

Section H

Spot the mistakes and correct the answer.

Archie needed to draw a diagram to show the resultant of $3\mathbf{b} + \mathbf{a}$ when $\mathbf{a} = \begin{pmatrix}5\\-2\end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix}1\\2\end{pmatrix}$.

This is his diagram.



Explain Archie's mistake and draw a correct diagram below.