

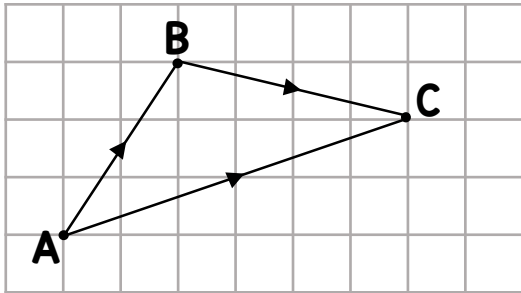
Summer Term Maths Year 10

Addition & Subtraction of Column Vectors

Day
2

Week 8

1 Look at the diagram.



(a) Write the following as column vectors

(i) \vec{AB} (ii) \vec{BC} (iii) \vec{AC}

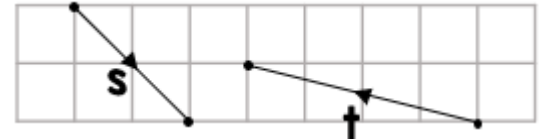
(b) Use the column vectors from part (a)

to show that $\vec{AB} + \vec{BC} = \vec{AC}$

(c) Now use your answers to part (a) to

show that $\vec{AC} - \vec{BC} = \vec{AB}$

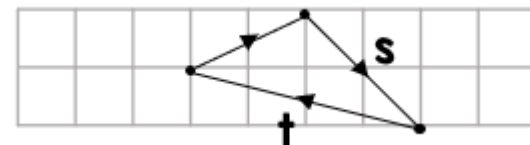
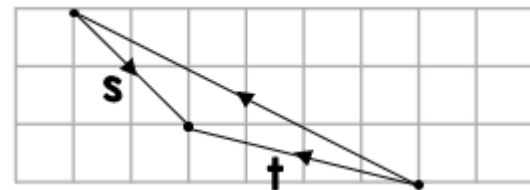
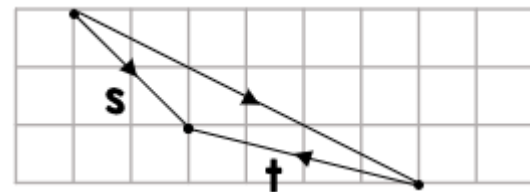
2 $s = \begin{pmatrix} 2 \\ -2 \end{pmatrix}$ $t = \begin{pmatrix} -4 \\ 1 \end{pmatrix}$



(a) Calculate the following

(i) $s + t$ (ii) $s - t$ (iii) $t - s$

(b) Match each of the resultant vectors from part (a) to the following diagrams.



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3 Decide whether each calculation is true or false.

If false, find the correct solution.

$$g = \begin{pmatrix} 5 \\ -1 \end{pmatrix} \quad h = \begin{pmatrix} -2 \\ 4 \end{pmatrix}$$

$$(a) \quad g - h = \begin{pmatrix} 5 \\ -1 \end{pmatrix} - \begin{pmatrix} -2 \\ 4 \end{pmatrix} = \begin{pmatrix} 5-2 \\ -1-4 \end{pmatrix} = \begin{pmatrix} 3 \\ -5 \end{pmatrix}$$

$$(b) \quad 2g + h = 2 \begin{pmatrix} 5 \\ -1 \end{pmatrix} + \begin{pmatrix} -2 \\ 4 \end{pmatrix} = \begin{pmatrix} 2 \times 5 + -2 \\ 2 \times -1 + 4 \end{pmatrix} = \begin{pmatrix} 8 \\ 2 \end{pmatrix}$$

$$(c) \quad h - 3g = \begin{pmatrix} -2 \\ 4 \end{pmatrix} - 3 \begin{pmatrix} 5 \\ -1 \end{pmatrix} = \begin{pmatrix} -2-3 \times 5 \\ -4-3 \times -1 \end{pmatrix} = \begin{pmatrix} -17 \\ -7 \end{pmatrix}$$

$$(d) \quad 4g + 2h = 4 \begin{pmatrix} 5 \\ -1 \end{pmatrix} + 2 \begin{pmatrix} -2 \\ 4 \end{pmatrix} = \begin{pmatrix} 4 \times 5 + 2 \times -2 \\ 4 \times -1 + 2 \times 4 \end{pmatrix} = \begin{pmatrix} 14 \\ 4 \end{pmatrix}$$

4 If $q = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$ $r = \begin{pmatrix} 7 \\ -2 \end{pmatrix}$ $s = \begin{pmatrix} -2 \\ -3 \end{pmatrix}$

Find:

(a) $q + r$ (b) $2q + r$ (c) $r - q$

(d) $2r - q$ (e) $2r - 3q$ (f) $2r + s$

(g) $2q + r - s$ (h) $2r - q + 3s$

5 If $x = \begin{pmatrix} -2 \\ 0 \end{pmatrix}$ and $y = \begin{pmatrix} 3 \\ -4 \end{pmatrix}$

A calculation involving x and y gives the following resultant vectors.

What could the calculation be?

(a) $\begin{pmatrix} 1 \\ -4 \end{pmatrix}$ (b) $\begin{pmatrix} 5 \\ -4 \end{pmatrix}$ (c) $\begin{pmatrix} 5 \\ -12 \end{pmatrix}$