

12 (a) $\overrightarrow{PQ} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$

Work out $5\overrightarrow{PQ}$.

(a)

$$\begin{pmatrix} \\ \end{pmatrix}$$

[1]

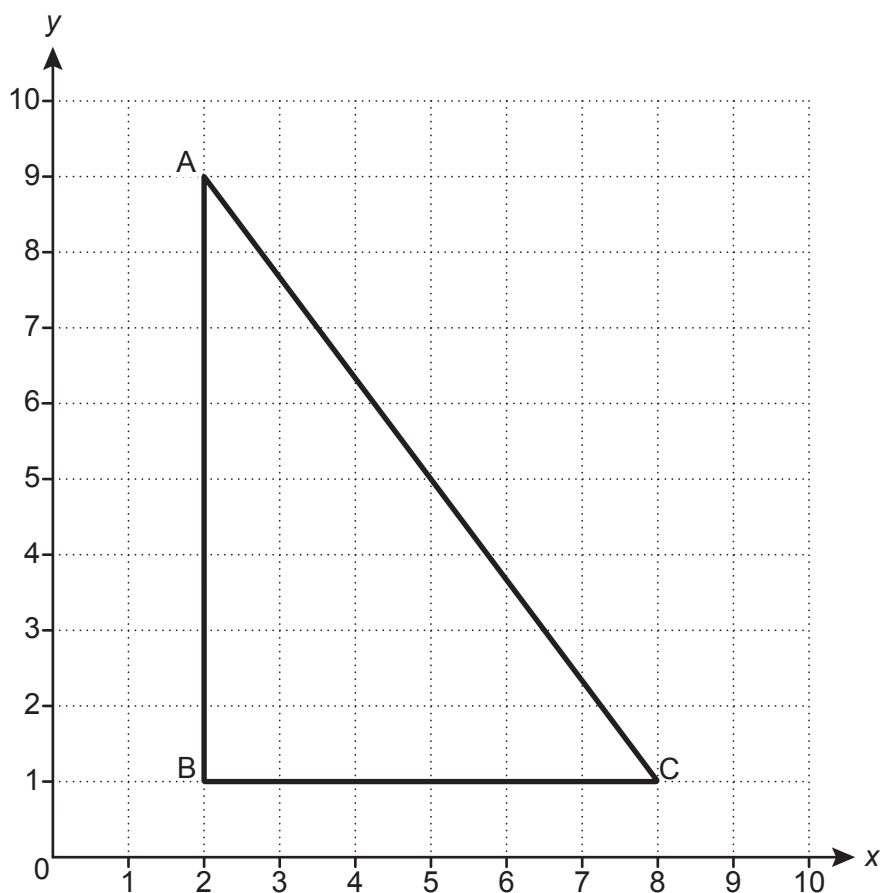
(b) Find the values of h and k .

$$\begin{pmatrix} h \\ 5 \end{pmatrix} + \begin{pmatrix} 2 \\ k \end{pmatrix} - \begin{pmatrix} 3 \\ 3 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$$

(b) $h = \dots\dots\dots$

$k = \dots\dots\dots$ [2]

(c) Triangle ABC is drawn on a coordinate grid.



$$\overrightarrow{AB} = \begin{pmatrix} 0 \\ -8 \end{pmatrix}$$

(i) Use the diagram to complete this vector sum.

$$\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CA} = \begin{pmatrix} 0 \\ -8 \end{pmatrix} + \begin{pmatrix} \quad \\ \quad \end{pmatrix} + \begin{pmatrix} \quad \\ \quad \end{pmatrix} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$$

[2]

(ii) Give a reason why the answer to the sum could be written down **without doing any working**.

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..... [1]