N5 Maths: Vectors

Non-calculator

Q1 Express each resultant vector in component form:

a) $\begin{pmatrix}3\\-2\end{pmatrix}+\begin{pmatrix}-1\\5\end{pmatrix}$ **b)** $\begin{pmatrix}2\\-1\end{pmatrix}+\begin{pmatrix}0\\-3\end{pmatrix}+\begin{pmatrix}-4\\6\end{pmatrix}$ **c)** $\begin{pmatrix}-2\\6\end{pmatrix}-\begin{pmatrix}3\\2\end{pmatrix}$

d) $\begin{pmatrix}8\\6\end{pmatrix}-\begin{pmatrix}3\\-1\end{pmatrix}-\begin{pmatrix}-4\\5\end{pmatrix}$ **e)** $2\begin{pmatrix}3\\1\end{pmatrix}+3\begin{pmatrix}3\\-2\end{pmatrix}$ **f)** $4\begin{pmatrix}1\\-2\end{pmatrix}-3\begin{pmatrix}-1\\-3\end{pmatrix}$

g) $\frac{1}{2}\begin{pmatrix}6\\-8\end{pmatrix}-\frac{2}{3}\begin{pmatrix}-6\\9\end{pmatrix}$ **h)** $3\begin{pmatrix}0\\-1\end{pmatrix}+\begin{pmatrix}-3\\1\end{pmatrix}-\frac{1}{4}\begin{pmatrix}12\\-8\end{pmatrix}$ **i)** $-2\begin{pmatrix}5\\-2\end{pmatrix}-5\begin{pmatrix}-3\\4\end{pmatrix}$

Q2 Express each resultant vector in component form:

a) $\begin{pmatrix}2\\-1\\4\end{pmatrix}+\begin{pmatrix}3\\7\\-2\end{pmatrix}$ **b)** $\begin{pmatrix}3\\0\\-1\end{pmatrix}-\begin{pmatrix}-1\\-4\\3\end{pmatrix}$ **c)** $\begin{pmatrix}1\\-2\\-3\end{pmatrix}-\begin{pmatrix}1\\0\\-1\end{pmatrix}+\begin{pmatrix}-5\\5\\-2\end{pmatrix}$

d) $3\begin{pmatrix}-1\\2\\-2\end{pmatrix}-2\begin{pmatrix}1\\-3\\-1\end{pmatrix}$ **e)** $\frac{1}{2}\begin{pmatrix}-6\\8\\10\end{pmatrix}+\frac{3}{4}\begin{pmatrix}12\\-8\\20\end{pmatrix}$ **f)** $2\begin{pmatrix}-1\\6\\-4\end{pmatrix}+3\begin{pmatrix}1\\3\\2\end{pmatrix}-\begin{pmatrix}5\\3\\2\end{pmatrix}$

Q3 Four vectors are such that $\boldsymbol{a}+\boldsymbol{d}=\boldsymbol{c}$ and $2\boldsymbol{a}+2\boldsymbol{b}=\boldsymbol{c}$.

a) Express $\boldsymbol{d}$ in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$.

b) Express $\boldsymbol{d}$ in terms of $\boldsymbol{b}$ and $\boldsymbol{c}$.

Q4 In triangle PQR, $\overrightarrow{PR}=\begin{pmatrix}6\\-4\\-2\end{pmatrix}$, $\overrightarrow{RQ}=\begin{pmatrix}5\\2\\-3\end{pmatrix}$ and M is the midpoint of PR.

a) Express $\overrightarrow{\mathrm{PQ}}$ in component form.

b) Express $\overrightarrow{\mathrm{MQ}}$ in component form.

Q5 Calculate the magnitude of each vector. Non-integer values should be expressed as exact surds.

a) $\begin{pmatrix}3\\-4\end{pmatrix}$ **b)** $\begin{pmatrix}-5\\12\end{pmatrix}$ **c)** $\begin{pmatrix}-1\\-2\end{pmatrix}$

d) $\begin{pmatrix}2\\-2\\1\end{pmatrix}$ **e)** $\begin{pmatrix}4\\1\\-1\end{pmatrix}$ **f)** $\begin{pmatrix}-2\\4\\4\end{pmatrix}$

Q6 $\boldsymbol{u}=\begin{pmatrix}1\\-3\end{pmatrix}$ and $\boldsymbol{v}=\begin{pmatrix}2\\3\end{pmatrix}$. Determine $|2\boldsymbol{u}+\boldsymbol{v}|$.

This resource is copyright © Maths.scot, released under a Creative Commons "Attribution, Non-Commercial, No Derivatives" (CC BY-NC-ND 4.0) licence.