National 5 Homework	
Geometry Skills	Working with vectors

1. Vector $\boldsymbol{a}$ has components $\begin{pmatrix}3\\5\end{pmatrix}$ and vector $\boldsymbol{b}$ has components $\begin{pmatrix}4\\-3\end{pmatrix}$
Calculate $|\boldsymbol{a}-2\boldsymbol{b}|$.

2. Three vectors have components as shown:
$\boldsymbol{p}=\begin{pmatrix}4\\-2\\1\end{pmatrix}$ $\boldsymbol{q}=\begin{pmatrix}-3\\1\\2\end{pmatrix}$ $\boldsymbol{r}=\begin{pmatrix}0\\4\\5\end{pmatrix}$

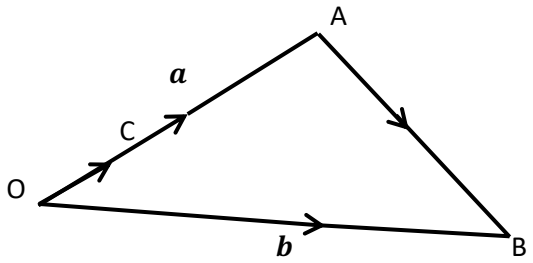
Calculate the resultant vectors and magnitudes of the following:
a) $\boldsymbol{p}+2\boldsymbol{q}$ b) $\boldsymbol{r}-\boldsymbol{q}$ c) $2\boldsymbol{q}+\boldsymbol{r}$

3. The magnitude of vector $\begin{pmatrix}3\\a\end{pmatrix}$ is 5 and $a>0$. Find the value of a.

4. a) Vector $\boldsymbol{a}$ has components $\begin{pmatrix}-2\\6\\3\end{pmatrix}$. Find $|2\boldsymbol{a}|$.

b) Determine whether $|2\boldsymbol{a}| = 2|\boldsymbol{a}|$

5. A vector diagram is shown below where $\overrightarrow{OA}=\boldsymbol{a}$, $\overrightarrow{OB}=\boldsymbol{b}$ and $\overrightarrow{OC}=\frac{1}{3}\overrightarrow{OA}$.



Express the following directed line segments in terms of vectors $\boldsymbol{a}$ and $\boldsymbol{b}$:

a) $\overrightarrow{CA}$ b) $\overrightarrow{BA}$ c) $\overrightarrow{BC}$