



Vectors - Questions

Q1) For the following points A & B , write the vector \overrightarrow{AB} in component form.

a) $A = (1, 4), B = (-2, 5)$ b) $A = (-1, 2), B = (6, 6)$ c) $A = (3, 3), B = (-3, -3)$

Q2) If $\underline{a} = \begin{pmatrix} 2 \\ 1 \\ -3 \end{pmatrix}$ & $\underline{b} = \begin{pmatrix} -2 \\ 0 \\ -4 \end{pmatrix}$, find

a) $2\underline{a}$. How does this vector compare to \underline{a} ?

b) $-4\underline{a}$. How does this vector compare to \underline{a} ?

Q3) $\underline{u} = \begin{pmatrix} -1 \\ 2 \\ 3 \end{pmatrix}, \underline{v} = \begin{pmatrix} 0 \\ 3 \\ -2 \end{pmatrix}, \underline{w} = \begin{pmatrix} 3 \\ -2 \\ 4 \end{pmatrix}$. Express the following as column vectors.

a) $\underline{u} + \underline{v}$

c) $\underline{u} - \underline{w}$

b) $\underline{v} + 2\underline{w}$

d) $2\underline{u} + \underline{w} - 3\underline{v}$

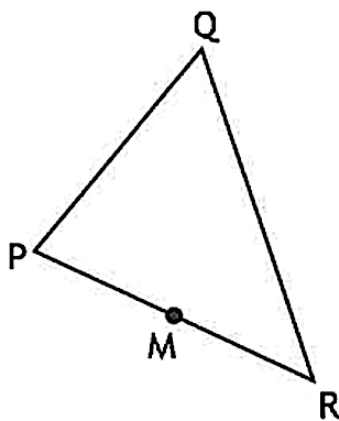
Q4) Find the magnitude of the following vectors.

a) $\overrightarrow{PQ} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$

b) $\overrightarrow{RS} = \begin{pmatrix} -2 \\ 5 \end{pmatrix}$

c) $\overrightarrow{AB} = \begin{pmatrix} 3 \\ 4 \\ -1 \end{pmatrix}$

Q5) In the triangle PQR, $\overrightarrow{PR} = \begin{pmatrix} 6 \\ -4 \end{pmatrix}$ and $\overrightarrow{RQ} = \begin{pmatrix} -1 \\ 8 \end{pmatrix}$.



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

b) M is the mid-point of PR.

Express \overrightarrow{MQ} in component form.



Vectors - Solutions

Q1) a) $\overrightarrow{AB} = \begin{pmatrix} -3 \\ 1 \end{pmatrix}$

b) $\overrightarrow{AB} = \begin{pmatrix} 7 \\ 4 \end{pmatrix}$

c) $\overrightarrow{AB} = \begin{pmatrix} -6 \\ -6 \end{pmatrix}$

Q2) a) $2\underline{a} = \begin{pmatrix} 4 \\ -6 \end{pmatrix}$. This vector is in the same direction as \underline{a} but is twice as long.

b) $-4\underline{a} = \begin{pmatrix} -8 \\ 12 \end{pmatrix}$. This vector is in the opposite direction as \underline{a} and is four times longer.

Q3) a) $\underline{u} + \underline{v} = \begin{pmatrix} -1 \\ 5 \\ 1 \end{pmatrix}$

c) $\underline{u} - \underline{w} = \begin{pmatrix} -4 \\ 4 \\ -1 \end{pmatrix}$

b) $\underline{v} + 2\underline{w} = \begin{pmatrix} 6 \\ -1 \\ 6 \end{pmatrix}$

d) $2\underline{u} + \underline{w} - 3\underline{v} = \begin{pmatrix} -1 \\ -7 \\ 16 \end{pmatrix}$

Q4) a) $|\overrightarrow{PQ}| = \sqrt{2^2 + (-3)^2} = \sqrt{13}$

b) $|\overrightarrow{RS}| = \sqrt{(-2)^2 + 5^2} = \sqrt{29}$

c) $|\overrightarrow{AB}| = \sqrt{3^2 + 4^2 + (-1)^2} = \sqrt{26}$

Q5) a) $\overrightarrow{PQ} = \begin{pmatrix} 5 \\ 4 \end{pmatrix}$

b) $\overrightarrow{MQ} = \begin{pmatrix} 2 \\ 6 \end{pmatrix}$