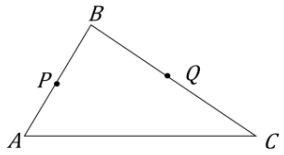
Vectors GREEN

1. Group the following into sets of parallel vectors. Justify your decisions.

$2\boldsymbol{a} + \boldsymbol{b}$ $\quad 2\boldsymbol{p} + \boldsymbol{q}$ $\quad 2\boldsymbol{a} - \boldsymbol{b}$ $\quad 4\boldsymbol{b} + 8\boldsymbol{a}$

$10\boldsymbol{a} - 5\boldsymbol{b}$ $\quad -\boldsymbol{b} - 2\boldsymbol{a}$ $\quad \frac{1}{2}\boldsymbol{q} + \boldsymbol{p}$

2. In triangle ABC, $\overrightarrow{AB} = \boldsymbol{a}$ and $\overrightarrow{AC} = \boldsymbol{b}$. P is the midpoint of AB and Q is the midpoint of BC.

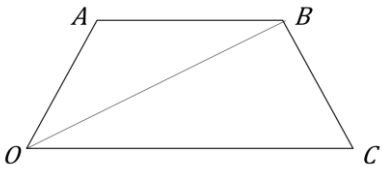


a) Write in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$:

i) $\overrightarrow{BC}$ _____ ii) $\overrightarrow{AP}$ _____ iii) $\overrightarrow{AQ}$ _____ iv) $\overrightarrow{PQ}$ _____

b) Show that PQ is parallel to AC.

3. $OABC$ is a quadrilateral. $\overrightarrow{OA} = \boldsymbol{a}$, $\overrightarrow{OC} = 3\boldsymbol{b}$ and $\overrightarrow{OB} = \boldsymbol{a} + 2\boldsymbol{b}$.



a) Find, in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$:

i) $\overrightarrow{AB}$ _____ ii) $\overrightarrow{CB}$ _____

b) Show that AB is parallel to OC.

4. The vectors $2\boldsymbol{a} + k\boldsymbol{b}$ and $5\boldsymbol{a} + 3\boldsymbol{b}$ are parallel. Find the value of k.

Vectors AMBER

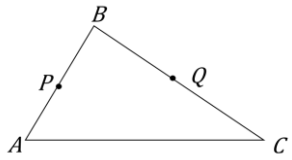
1. Group the following into sets of parallel vectors. Justify your decisions.

$2\boldsymbol{a} + \boldsymbol{b}$ $\quad 2\boldsymbol{p} + \boldsymbol{q}$ $\quad 2\boldsymbol{a} - \boldsymbol{b}$ $\quad 4\boldsymbol{b} + 8\boldsymbol{a}$

$10\boldsymbol{a} - 5\boldsymbol{b}$ $\quad -\boldsymbol{b} - 2\boldsymbol{a}$ $\quad \frac{1}{2}\boldsymbol{q} + \boldsymbol{p}$

Start by factorising any vectors that can be factorised

2. In triangle ABC, $\overrightarrow{AB} = \boldsymbol{a}$ and $\overrightarrow{AC} = \boldsymbol{b}$. P is the midpoint of AB and Q is the midpoint of BC.



Try sketching and labelling a larger version of this diagram

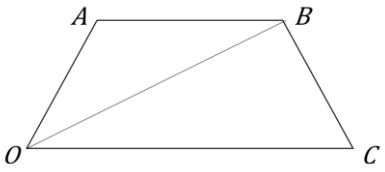
a) Write in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$:

i) $\overrightarrow{BC}$ _____ ii) $\overrightarrow{AP}$ _____ iii) $\overrightarrow{AQ}$ _____ iv) $\overrightarrow{PQ}$ _____

b) Show that PQ is parallel to AC.

Look for a common factor

3. $OABC$ is a quadrilateral. $\overrightarrow{OA} = \boldsymbol{a}$, $\overrightarrow{OC} = 3\boldsymbol{b}$ and $\overrightarrow{OB} = \boldsymbol{a} + 2\boldsymbol{b}$.



a) Find, in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$:

i) $\overrightarrow{AB}$ _____ ii) $\overrightarrow{CB}$ _____

Try sketching and labelling a larger version of this diagram

b) Show that AB is parallel to OC.

Look for a common factor

4. The vectors $2\boldsymbol{a} + k\boldsymbol{b}$ and $5\boldsymbol{a} + 3\boldsymbol{b}$ are parallel. Find the value of k.

Factorise both vectors and compare

Vectors RED

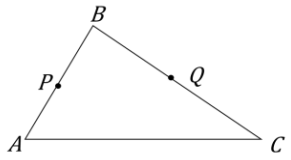
1. Group the following into sets of parallel vectors. Justify your decisions.

Start by factorising any vectors that can be factorised

$2\boldsymbol{a} + \boldsymbol{b}$ $\quad 2\boldsymbol{p} + \boldsymbol{q}$ $\quad 2\boldsymbol{a} - \boldsymbol{b}$ $\quad 4\boldsymbol{b} + 8\boldsymbol{a}$

$10\boldsymbol{a} - 5\boldsymbol{b}$ $\quad -\boldsymbol{b} - 2\boldsymbol{a}$ $\quad \frac{1}{2}\boldsymbol{q} + \boldsymbol{p}$

2. In triangle ABC, $\overrightarrow{AB} = \boldsymbol{a}$ and $\overrightarrow{AC} = \boldsymbol{b}$. P is the midpoint of AB and Q is the midpoint of BC.



Try sketching and labelling a larger version of this diagram

a) Write in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$:

i) $\overrightarrow{BC}$ ii) $\overrightarrow{AP}$ iii) $\overrightarrow{AQ}$ iv) $\overrightarrow{PQ}$

_____ _____ _____ _____

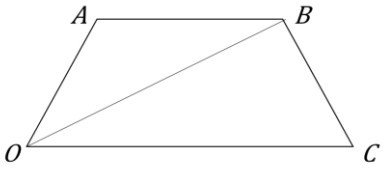
b) Show that PQ is parallel to AC.

Look for a common factor

$\overrightarrow{PQ}$ = _____ = __ (_____)

$\overrightarrow{BC}$ = _____ = __ (_____)

3. $OABC$ is a quadrilateral. $\overrightarrow{OA} = \boldsymbol{a}$, $\overrightarrow{OC} = 3\boldsymbol{b}$ and $\overrightarrow{OB} = \boldsymbol{a} + 2\boldsymbol{b}$.



a) Find, in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$:

Try sketching and labelling a larger version of this diagram

i) $\overrightarrow{AB}$ ii) $\overrightarrow{CB}$

_____ _____

b) Show that AB is parallel to OC.

Look for a common factor

$\overrightarrow{AB}$ = _____ = __ (_____)

$\overrightarrow{OC}$ = _____ = __ (_____)

4. The vectors $2\boldsymbol{a} + k\boldsymbol{b}$ and $5\boldsymbol{a} + 3\boldsymbol{b}$ are parallel. Find the value of k.

Factorise both vectors and compare

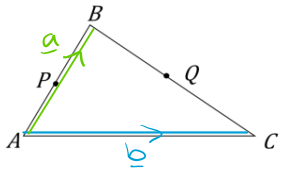
Vectors ANSWERS

1. Group the following into sets of parallel vectors. Justify your decisions.

$2\boldsymbol{a} + \boldsymbol{b}$ $\quad 2\boldsymbol{p} + \boldsymbol{q}$ $\quad 2\boldsymbol{a} - \boldsymbol{b}$ $\quad 4\boldsymbol{b} + 8\boldsymbol{a}$

$10\boldsymbol{a} - 5\boldsymbol{b}$ $\quad -\boldsymbol{b} - 2\boldsymbol{a}$ $\quad \frac{1}{2}\boldsymbol{q} + \boldsymbol{p}$

2. In triangle ABC, $\overrightarrow{AB} = \boldsymbol{a}$ and $\overrightarrow{AC} = \boldsymbol{b}$. P is the midpoint of AB and Q is the midpoint of BC.



a) Write in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$:

i) $\overrightarrow{BC}$ $\quad$ ii) $\overrightarrow{AP}$ $\quad$ iii) $\overrightarrow{AQ}$ $\quad$ iv) $\overrightarrow{PQ}$

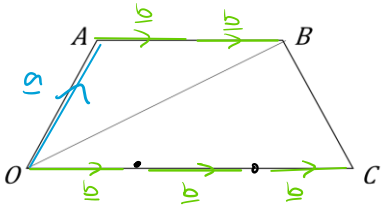
$\underline{b} - \underline{a}$ $\quad \frac{1}{2}\underline{a}$ $\quad \frac{1}{2}(\underline{a}+\underline{b})$ $\quad \frac{1}{2}\underline{b}$

b) Show that PQ is parallel to AC.

$\overrightarrow{PQ} = \frac{1}{2}\underline{b}$ and $\overrightarrow{AC} = \underline{b}$

Since $\underline{b}$ is a common factor, PQ and AC are parallel.

3. $OABC$ is a quadrilateral. $\overrightarrow{OA} = \boldsymbol{a}$, $\overrightarrow{OC} = 3\boldsymbol{b}$ and $\overrightarrow{OB} = \boldsymbol{a} + 2\boldsymbol{b}$.



a) Find, in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$:

i) $\overrightarrow{AB}$ $\quad$ ii) $\overrightarrow{CB}$

$2\underline{b}$ $\quad \underline{a} - \underline{b}$

b) Show that AB is parallel to OC.

$\overrightarrow{AB} = 2\underline{b}$ and $\overrightarrow{OC} = 3\underline{b}$

Since $\underline{b}$ is a common factor, AB and OC are parallel

4. The vectors $2\boldsymbol{a} + k\boldsymbol{b}$ and $5\boldsymbol{a} + 3\boldsymbol{b}$ are parallel. Find the value of k.

$\lambda(2\underline{a} + k\underline{b}) = 5\underline{a} + 3\underline{b}$

$\lambda = \frac{5}{2}$ $\quad \therefore \quad \frac{5}{2}k = 3 \quad \Rightarrow \quad k = \frac{6}{5}$