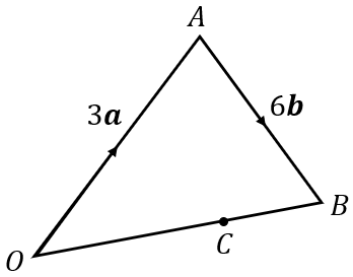
Vectors and Ratio

(a)

In the triangle OAB, $\overrightarrow{OA} = 3\boldsymbol{a}$ and $\overrightarrow{AB} = 6\boldsymbol{b}$. The point C divides the line OB in the ratio $2:1$.



Express the following in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$:

(a) $\overrightarrow{OB}$

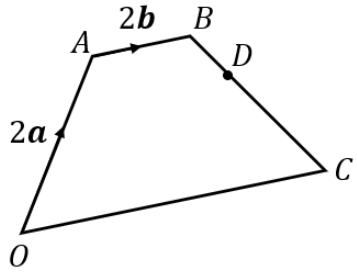
(b) $\overrightarrow{OC}$

(c) $\overrightarrow{BC}$

(d) $\overrightarrow{AC}$

(b)

$OABC$ is a trapezium, where $\overrightarrow{OA} = 2\boldsymbol{a}$ and $\overrightarrow{AB} = 2\boldsymbol{b}$. $\overrightarrow{OC} = 2\overrightarrow{AB}$ and D splits the line BC in the ratio $1:3$.



Express the following in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$:

(a) $\overrightarrow{BO}$

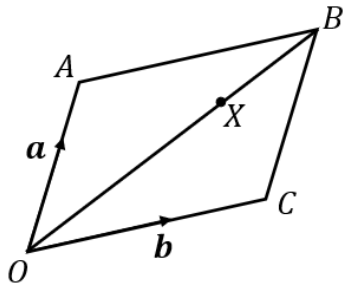
(b) $\overrightarrow{BC}$

(c) $\overrightarrow{BD}$

(d) $\overrightarrow{DO}$

(c)

In the parallelogram $OABC$, $\overrightarrow{OA} = \boldsymbol{a}$ and $\overrightarrow{OC} = \boldsymbol{b}$. The point X divides the line OB in the ratio $3:2$.



Express the following in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$:

(a) $\overrightarrow{AB}$

(b) $\overrightarrow{OB}$

(c) $\overrightarrow{OX}$

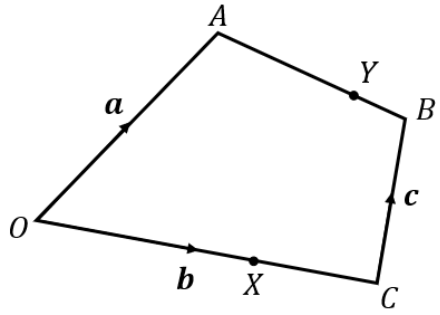
(d) $\overrightarrow{BX}$

(e) $\overrightarrow{AX}$

(f) $\overrightarrow{XC}$

(d)

$OABC$ is a quadrilateral. $\overrightarrow{OA} = \boldsymbol{a}$, $\overrightarrow{OC} = \boldsymbol{b}$ and $\overrightarrow{CB} = \boldsymbol{c}$. The point X divides the line OC in the ratio $2:1$. The point Y divides the line AB in the ratio $3:1$.



Express the following in terms of $\boldsymbol{a}, \boldsymbol{b}$ and $\boldsymbol{c}$:

(a) $\overrightarrow{OX}$

(b) $\overrightarrow{XC}$

(c) $\overrightarrow{AB}$

(d) $\overrightarrow{AY}$

(e) $\overrightarrow{AX}$

(f) $\overrightarrow{XY}$