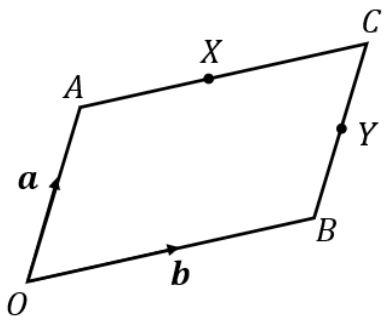
Vector Proof – Parallel Lines

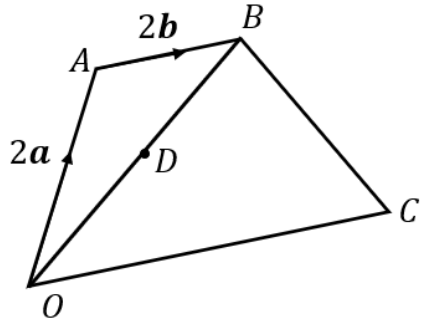
(a)

$OACB$ is a parallelogram. $\overrightarrow{OA} = \boldsymbol{a}$ and $\overrightarrow{OB} = \boldsymbol{b}$. X is the midpoint of AC and Y is the midpoint of BC. Show that XY and AB are parallel.



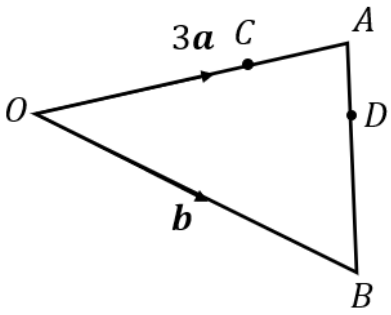
(b)

$OACB$ is a trapezium. $\overrightarrow{OA} = 2\boldsymbol{a}$ and $\overrightarrow{AB} = 2\boldsymbol{b}$. $\overrightarrow{OC} = 2\overrightarrow{AB}$ and D is the midpoint of OB. Show that AD is parallel to BC.



(c)

In the triangle OAB, $\overrightarrow{OB} = \boldsymbol{b}$ and $\overrightarrow{OA} = 3\boldsymbol{a}$. The point C divides the line OA in the ratio $2:1$ and the point D divides the line AB in the ratio $1:2$. Show that CD is parallel to OB.



(d)

In the triangle OAB, $\overrightarrow{OB} = \boldsymbol{b}$ and $\overrightarrow{OA} = \boldsymbol{a}$. Point B is the midpoint of the line OC and X is the midpoint of AB. The point Y divides the line OA in the ratio $3:1$. Show that YX is parallel to AC.