11.1) Vectors

Worked example

$PQRS$ is a parallelogram.
N is the point on SQ such that $SN : NQ = 3 : 4$
$\overrightarrow{PQ} = \boldsymbol{b}$ and $\overrightarrow{PS} = \boldsymbol{a}$
Express $\overrightarrow{NR}$ in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$

Your turn

$PQRS$ is a parallelogram.
N is the point on SQ such that $SN : NQ = 3 : 2$
$\overrightarrow{PQ} = \boldsymbol{a}$ and $\overrightarrow{PS} = \boldsymbol{b}$
Express $\overrightarrow{NR}$ in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$

$$\frac{2}{5}\boldsymbol{a} + \frac{3}{5}\boldsymbol{b}$$

Worked example

OAB is a triangle.

$\overrightarrow{OA} = \boldsymbol{b}$ and $\overrightarrow{OB} = \boldsymbol{a}$

P is the point on AB such that $AP : PB = 2 : 3$.

Find $\overrightarrow{OP}$ in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$

Your turn

OAB is a triangle.

$\overrightarrow{OA} = \boldsymbol{a}$ and $\overrightarrow{OB} = \boldsymbol{b}$

P is the point on AB such that $AP : PB = 3 : 1$.

Find $\overrightarrow{OP}$ in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$

$$\frac{1}{4}\boldsymbol{a} + \frac{3}{4}\boldsymbol{b}$$

Worked example

Show that the vectors are parallel:

$3\boldsymbol{a} + 4\boldsymbol{b}$ and $15\boldsymbol{a} + 20\boldsymbol{b}$

$3\boldsymbol{a} + 4\boldsymbol{b}$ and $-0.75\boldsymbol{a} - \boldsymbol{b}$

Your turn

Show that the vectors are parallel:

$6\boldsymbol{a} + 8\boldsymbol{b}$ and $9\boldsymbol{a} + 12\boldsymbol{b}$

$$9\boldsymbol{a} + 12\boldsymbol{b} = \frac{3}{2}(6\boldsymbol{a} + 8\boldsymbol{b})$$