

In the diagram,

$$\vec{OA} = 4\mathbf{a} \text{ and } \vec{OB} = 4\mathbf{b}$$

OAC , OBX and BQC are all straight lines.

$$AC = 2OA \text{ and } BQ : QC = 1 : 3$$

a) Find, in terms of \mathbf{a} and \mathbf{b} , the vectors which represent

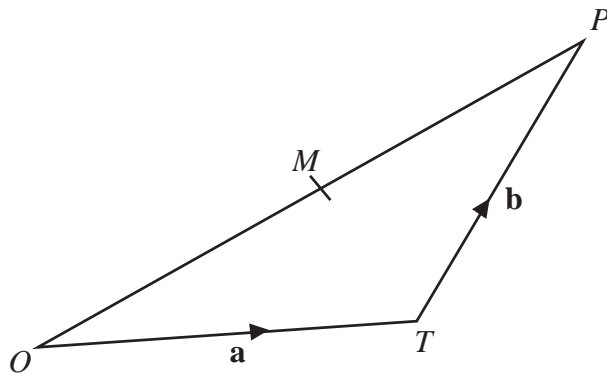
(i) \vec{BC}

(ii) \vec{AQ}

Given that $\vec{BX} = 8\mathbf{b}$

b) Show that AQX is a straight line.

1)



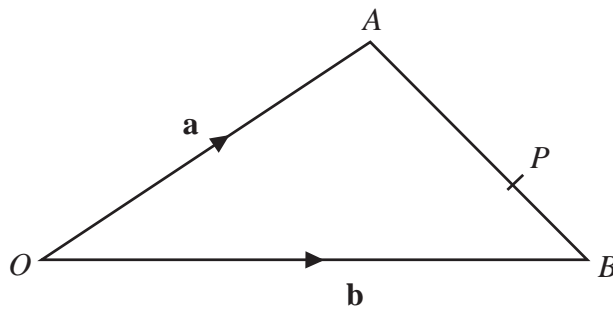
OPT is a triangle.
 M is the midpoint of OP .

$$\vec{OT} = \mathbf{a}$$

$$\vec{TP} = \mathbf{b}$$

- Express \vec{OM} in terms of \mathbf{a} and \mathbf{b} .
- Express \vec{TM} in terms of \mathbf{a} and \mathbf{b} .
Give your answer in its simplest form.

2)



OAB is a triangle.

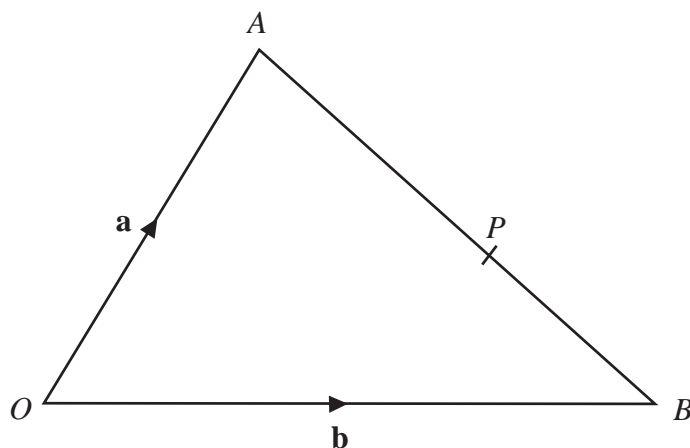
$$\vec{OA} = \mathbf{a}, \quad \vec{OB} = \mathbf{b}$$

- Find the vector \vec{AB} in terms of \mathbf{a} and \mathbf{b} .

P is the point on AB so that $AP : PB = 2 : 1$

- Find the vector \vec{OP} in terms of \mathbf{a} and \mathbf{b} .
Give your answer in its simplest form.

1)



OAB is a triangle.

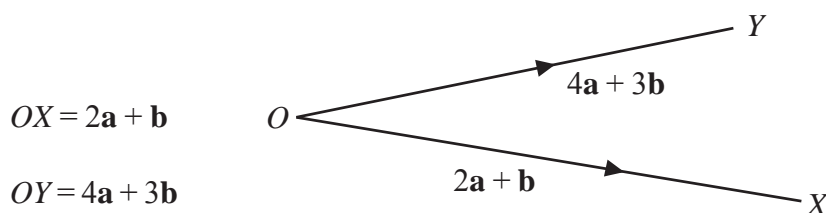
$$\vec{OA} = \mathbf{a}, \quad \vec{OB} = \mathbf{b}$$

a) Find the vector AB in terms of \mathbf{a} and \mathbf{b} .

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

b) Show that $\vec{OP} = \frac{1}{5}(2\mathbf{a} + 3\mathbf{b})$

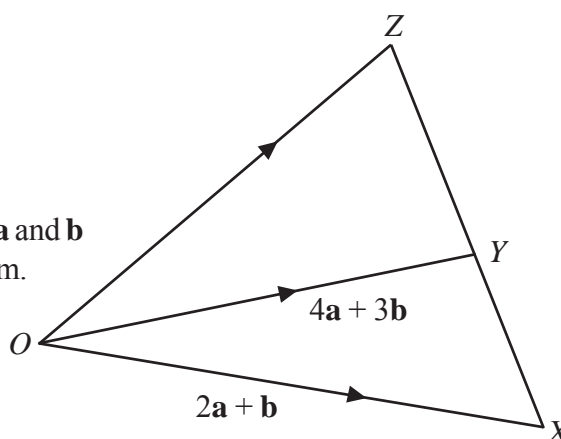
2)



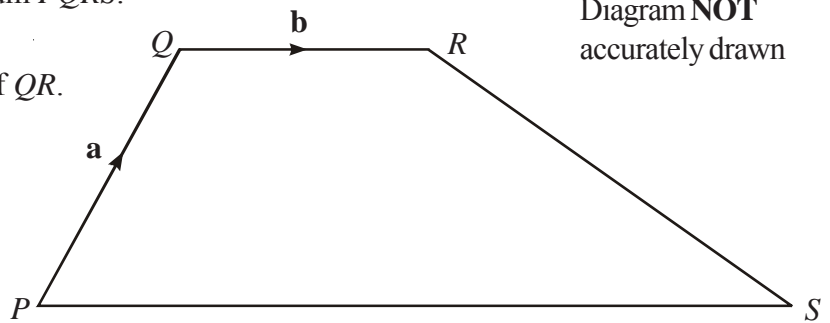
a) Express the vector XY in terms of \mathbf{a} and \mathbf{b}
Give your answer in its simplest form.

XYZ is a straight line.
 $XY : YZ = 2 : 3$

b) Express the vector OZ in terms of \mathbf{a} and \mathbf{b}
Give your answer in its simplest form.



- 1) The diagram shows a trapezium $PQRS$.
 $\vec{PQ} = \mathbf{a}$ and $\vec{QR} = \mathbf{b}$.
 PS is three times the length of QR .



Find, in terms of \mathbf{a} and \mathbf{b} , expressions for

- a) \vec{QP} b) \vec{PR} c) \vec{PS} d) \vec{QS}

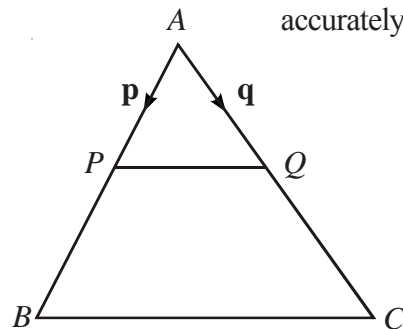
- 2) In triangle ABC , P and Q are the midpoints of AB and AC .

$\vec{AP} = \mathbf{p}$ and $\vec{AQ} = \mathbf{q}$.

Diagram **NOT** accurately drawn

a) Find, in terms of \mathbf{p} and \mathbf{q} , expressions for

- (i) \vec{PQ} (ii) \vec{AB} (iii) \vec{AC} (iv) \vec{BC}



b) Use your results from (a) to prove that PQ is parallel to BC .

- 3)

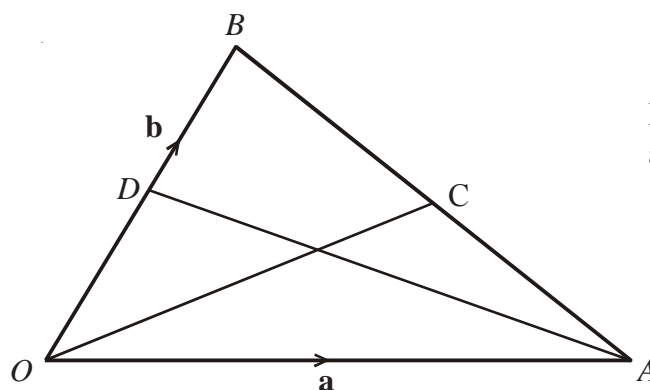


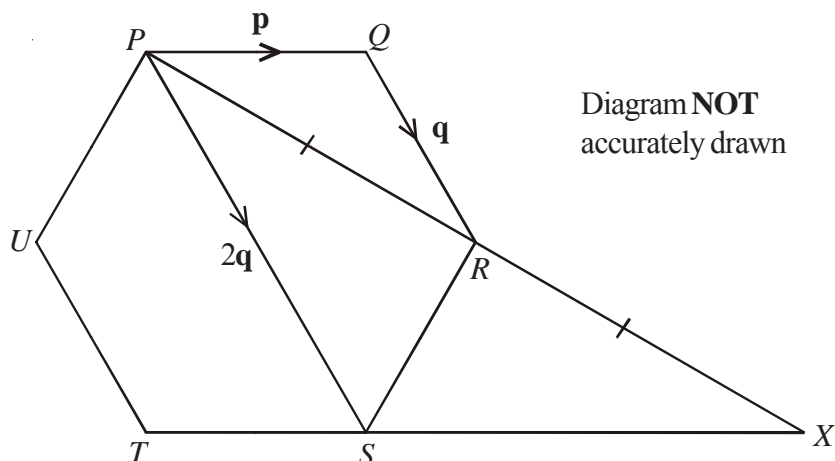
Diagram **NOT** accurately drawn

OAB is a triangle.
 D is the midpoint of OB .
 C is the midpoint of AB .
 $\vec{OA} = \mathbf{a}$ and $\vec{OB} = \mathbf{b}$

(i) Find \vec{OC} in terms of \mathbf{a} and \mathbf{b} .

(ii) Show that DC is parallel to OA .

1)



$PQRSTU$ is a regular hexagon.

$$\vec{PQ} = \mathbf{p} \quad \vec{QR} = \mathbf{q} \quad \vec{PS} = 2\mathbf{q}$$

a) Find the vector PR in terms of \mathbf{p} and \mathbf{q} .

$$\vec{PR} = \vec{RX}$$

b) Prove that PQ is parallel to SX

2)

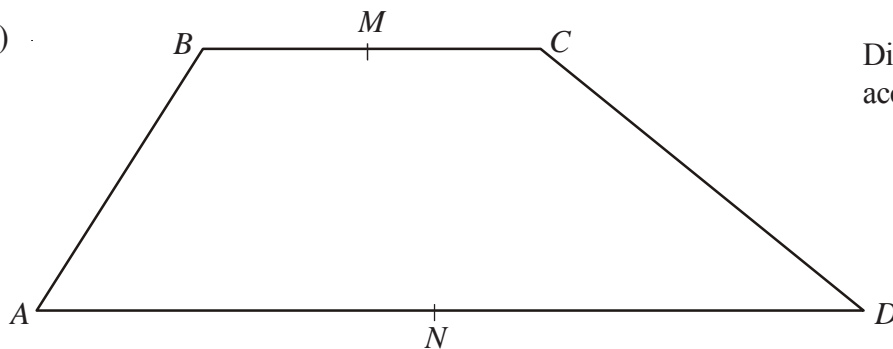


Diagram **NOT** accurately drawn

$ABCD$ is a trapezium with BC parallel to AD .

$$\vec{AB} = 3\mathbf{b} \quad \vec{BC} = 3\mathbf{a} \quad \vec{AD} = 9\mathbf{a}$$

M is the midpoint of BC and N is the midpoint of AD .

a) Find the vector MN in terms of \mathbf{a} and \mathbf{b} .

X is the midpoint of MN and Y is the midpoint of CD .

b) Prove that XY is parallel to AD .