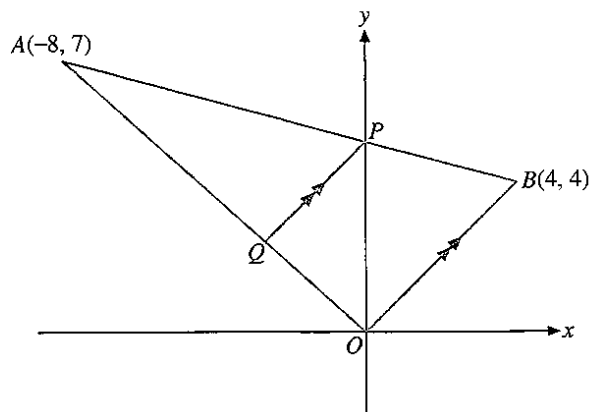


15.



In the diagram, the line segment joining $A(-8, 7)$ and $B(4, 4)$ cuts the y -axis at P . Q is a point on OA such that $QP \parallel OB$.

- Find the coordinates of P .
- Find the lengths AP and PB .
- Find the ratio $AP : AB$.
- Find the equation of the line OA .
- Express each of the following as a column vector.

(i) \vec{OB} (ii) \vec{OQ} (iii) \vec{QP}

(f) Find $\frac{\text{area of } \triangle AQP}{\text{area of quadrilateral } OBPO}$.

16. In the diagram, $\vec{OA} = \mathbf{a}$ and $\vec{OB} = \mathbf{b}$.

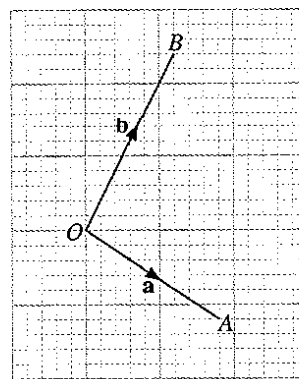
- (a) Copy the diagram and draw the vectors $2\mathbf{a} + \mathbf{b}$ and $\mathbf{a} - \frac{3}{2}\mathbf{b}$ on it.

(b) If $\vec{OA} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$ and $\vec{AB} = \begin{pmatrix} -1 \\ 6 \end{pmatrix}$,

- (i) express \vec{OB} as a column vector,

(ii) calculate $|2\mathbf{a} + \mathbf{b}|$,

- (iii) calculate the value of m if the vector $\vec{OC} = \begin{pmatrix} m \\ 2 \end{pmatrix}$ is parallel to \vec{AB} .



17. In the diagram, $\vec{OP} = \mathbf{p}$, $\vec{OQ} = \mathbf{q}$, $\vec{PR} = \frac{2}{5}\vec{PQ}$ and $\vec{PT} = k\mathbf{q}$.

- (a) Express the following in terms of \mathbf{p} and \mathbf{q} .

(i) \vec{PR}

(ii) \vec{OR}

- (b) Express \vec{OT} in terms of k , \mathbf{p} and \mathbf{q} .

- (c) If $k = \frac{2}{3}$ and the area of $\triangle OPQ = 60 \text{ cm}^2$,

(i) show that $\vec{OR} = \frac{3}{5}\vec{OT}$,

(ii) find the area of $\triangle ORQ$,

(iii) find the area of $\triangle PRT$.

