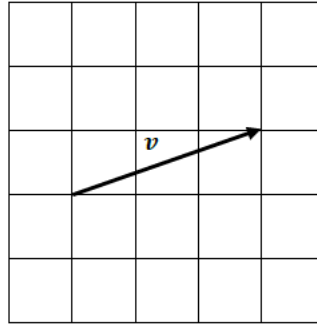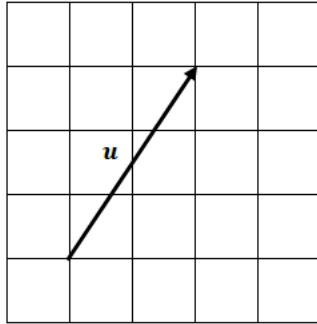## Ex 16 Vectors

1. The diagram below show 2 directed line segments **u** and **v**.

Draw the resultant of   a) **3u + v**   b) **2u + 2v**

2. Vector $a = \begin{pmatrix} 5 \\ 3 \end{pmatrix}$ and vector $b = \begin{pmatrix} 2 \\ -5 \end{pmatrix}$
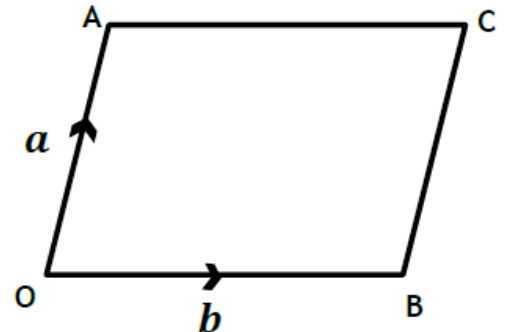
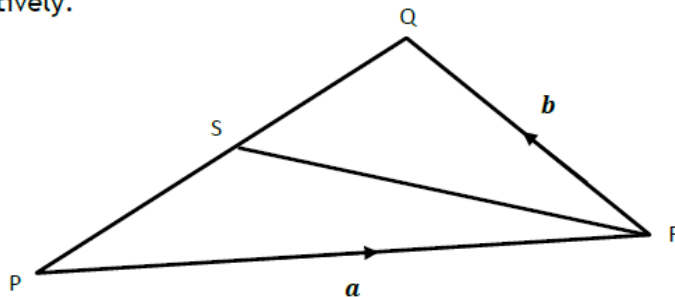Calculate $|2a + 3b|$.

3. In the diagram OACB is a parallelogram

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

In terms of **a** and **b** find

(i) $\overrightarrow{OC}$ (ii) $\overrightarrow{BA}$ (iii) $\overrightarrow{CA}$

4. In the diagram below vectors **a** and **b** are represented by $\overrightarrow{PR}$ and $\overrightarrow{RQ}$ respectively.

(a) Express $\overrightarrow{PQ}$ in terms of **a** and **b**.

(b) S is the midpoint of PQ. Express $\overrightarrow{QS}$ in terms of **a** and **b**.

5. Three vectors are defined as $\overrightarrow{AB} = \begin{pmatrix} 0 \\ 2 \\ -3 \end{pmatrix}$, $\overrightarrow{CD} = \begin{pmatrix} -3 \\ 0 \\ 0 \end{pmatrix}$ and $\overrightarrow{EF} = \begin{pmatrix} 1 \\ 1 \\ 5 \end{pmatrix}$.

Find:

(a) $|\overrightarrow{AB}|$ (b) $|\overrightarrow{CD}|$ (c) $|\overrightarrow{EF}|$

6. Two forces acting on a rocket are represented by vectors u and v.

$$u = \begin{pmatrix} 2 \\ -5 \\ -3 \end{pmatrix} \text{ and } v = \begin{pmatrix} 7 \\ 4 \\ -1 \end{pmatrix}.$$

Calculate $|u + v|$, the magnitude of the resultant force.