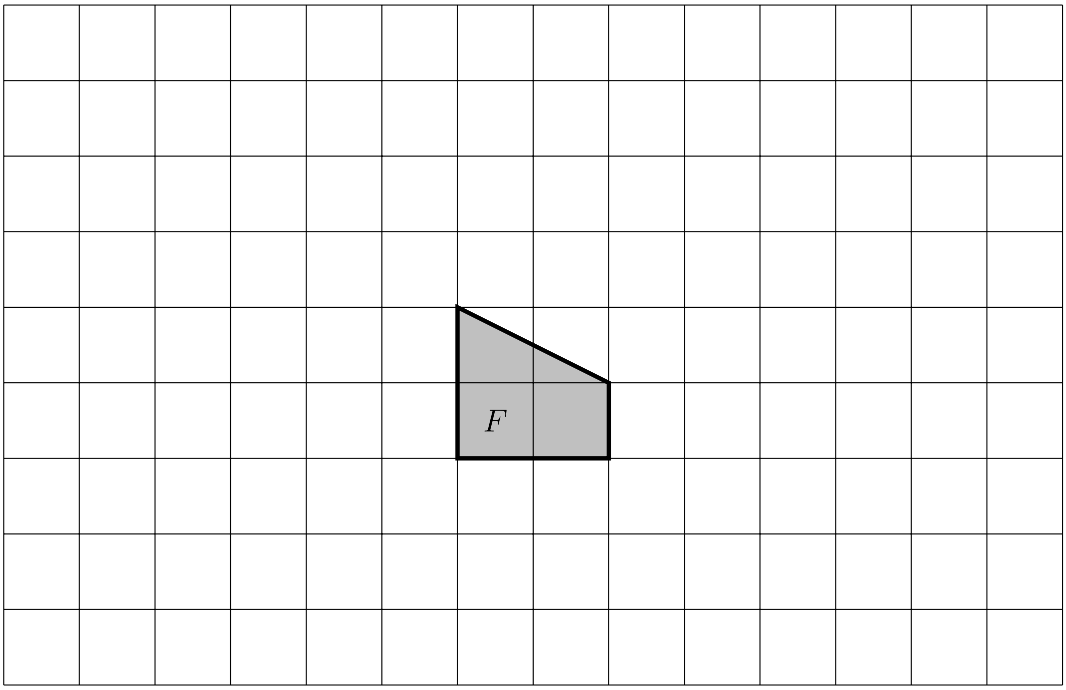
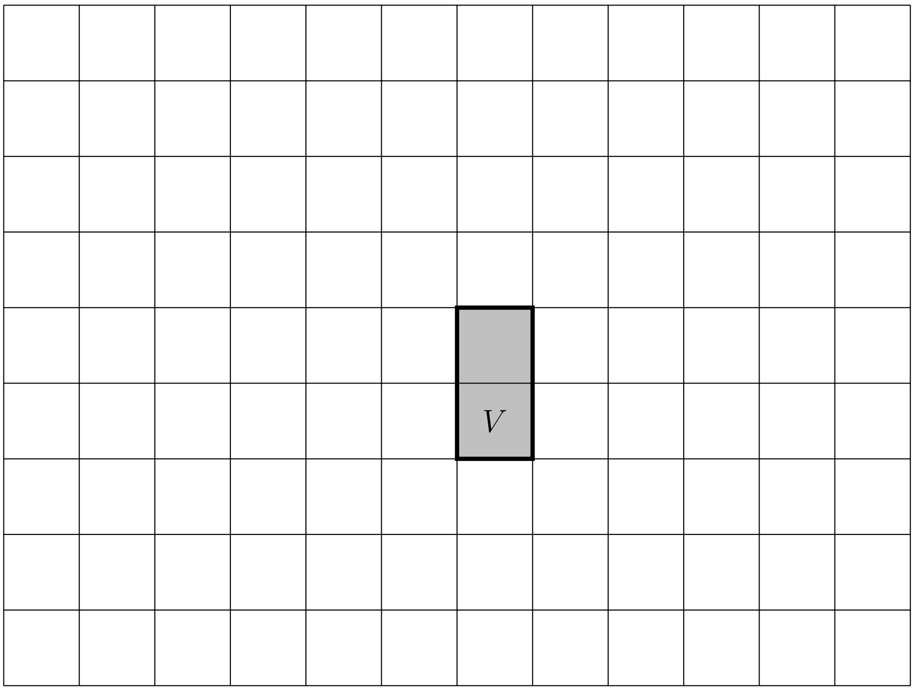
1. Translate shape F four squares to the left. {translate in 1 direction}



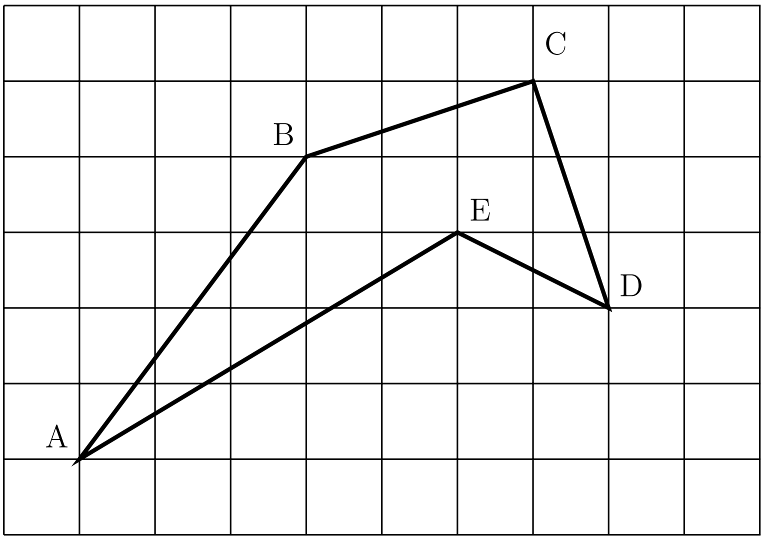
2. Translate shape V two squares to the left and one square up. {translate in 2 directions}



3.

3. **not written yet**

4. ABCDE is an irregular pentagon.



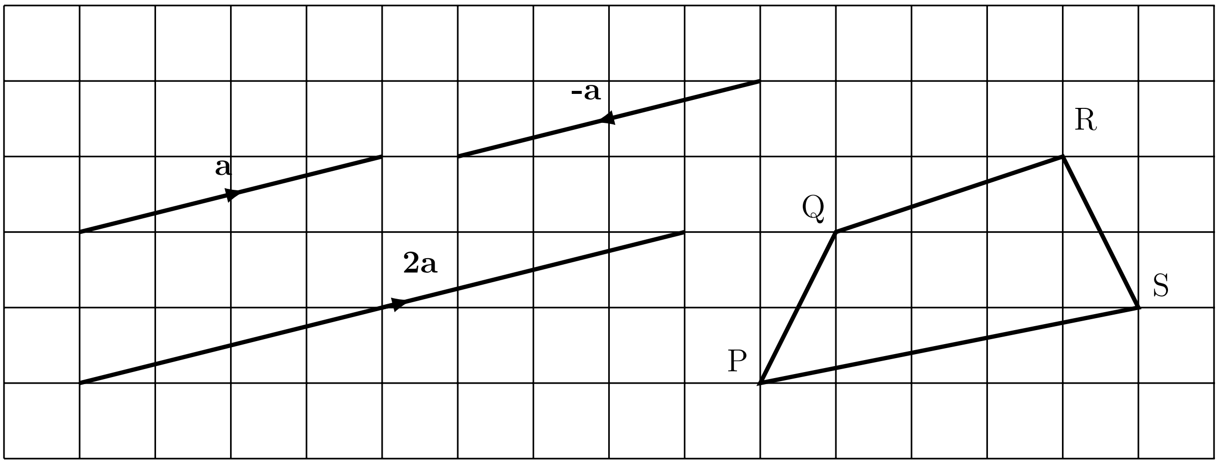
Write down the vector $\overrightarrow{AB}$

$$\overrightarrow{AB} = \begin{pmatrix} ..... \\ ..... \end{pmatrix}$$

5.

5. **not written yet**

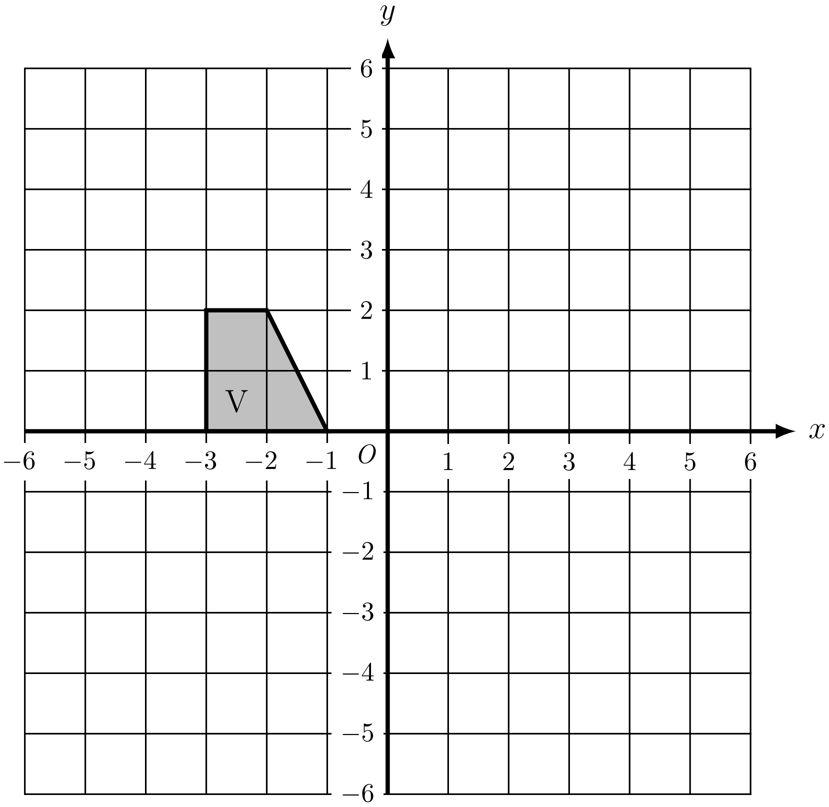
6. Here are some vectors.



Write down the column vectors for

(i) $\mathbf{a} = \begin{pmatrix} \\ \end{pmatrix}$ (ii) $\mathbf{-a} = \begin{pmatrix} \\ \end{pmatrix}$ (iii) $\mathbf{2a} = \begin{pmatrix} \\ \end{pmatrix}$ (iv) $\overrightarrow{SR} = \begin{pmatrix} \\ \end{pmatrix}$

7. On the grid below, translate trapezium V by the vector $\begin{bmatrix} 2 \\ -1 \end{bmatrix}$ and label it W

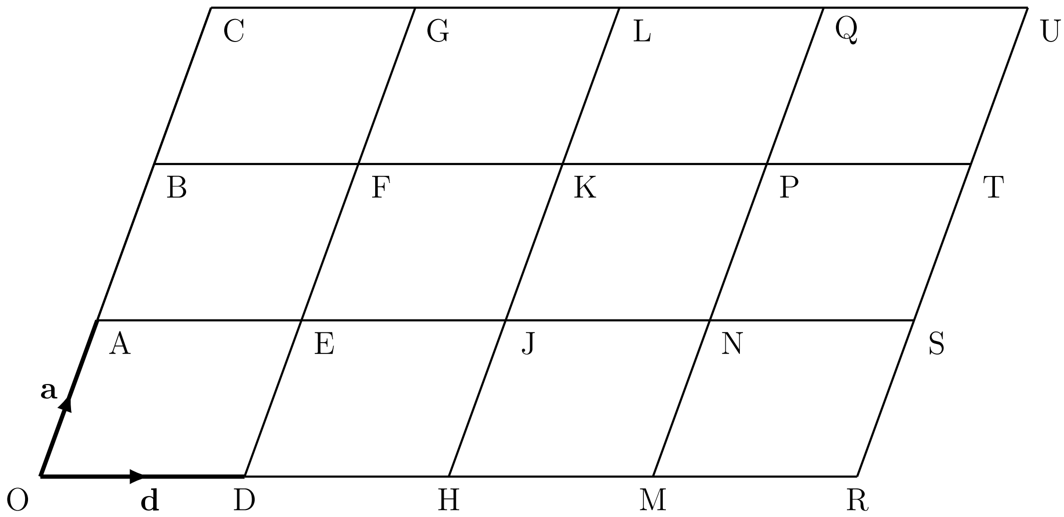


8. $\mathbf{p} = \begin{pmatrix} 5 \\ -3 \end{pmatrix}$ $\mathbf{q} = \begin{pmatrix} -2 \\ 1 \end{pmatrix}$

Complete these column vectors

(i) $2\mathbf{p} = \begin{pmatrix} \ldots\ldots \\ \ldots\ldots \end{pmatrix}$ (ii) $3\mathbf{q} = \begin{pmatrix} \ldots\ldots \\ \ldots\ldots \end{pmatrix}$

9. (a) The diagram below shows 12 congruent parallelograms.



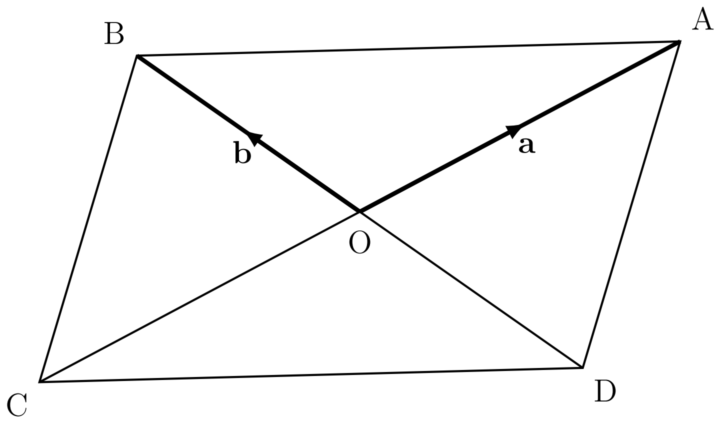
$\overrightarrow{OA} = \mathbf{a}$ {Handwriting **bold** is hard to do so mathematicians write $\underline{a}$ instead of **a**}

$\overrightarrow{OB} = \mathbf{d}$ {and write $\underline{d}$ instead of **d**}

Find in terms of **a** and **d** the vectors

(i) $\overrightarrow{AC}$ = ... (ii) $\overrightarrow{GU}$ = ...

(b) The diagram below shows parallelogram ABCD



The diagonals of the parallelogram intersect at O

$\overrightarrow{OA} = \mathbf{a}$ {Handwriting **bold** is hard to do so mathematicians write $\underline{a}$ instead of **a**}

$\overrightarrow{OB} = \mathbf{b}$ {and write $\underline{b}$ instead of **b**}

Write an expression, in terms of **a** and **b** for

(i) $\overrightarrow{CO}$ = ... (ii) $\overrightarrow{DB}$ = ...

10. $\mathbf{a} = \begin{pmatrix} -2 \\ -1 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} 3 \\ -4 \end{pmatrix}$

Work out $\mathbf{a} + \mathbf{b}$ as a column vector.

$\begin{pmatrix} ..... \\ ..... \end{pmatrix}$

11. $\mathbf{a} = \begin{pmatrix} 2 \\ -1 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$

Work out $3\mathbf{a} + 2\mathbf{b}$ as a column vector.

$\begin{pmatrix} ..... \\ ..... \end{pmatrix}$