

Translations

Starter

1. **(Review of previous material)**

State the new coordinates of the point $P(3, -2)$ after it is translated under the vectors:

(a) $\begin{pmatrix} 4 \\ 10 \end{pmatrix}$

(b) $\begin{pmatrix} -5 \\ 8 \end{pmatrix}$

Working: (a) $\begin{pmatrix} 3 \\ -2 \end{pmatrix} + \begin{pmatrix} 4 \\ 10 \end{pmatrix} = \begin{pmatrix} 7 \\ 8 \end{pmatrix}$
So the new coordinates of P are $(7, 8)$.

(b) $\begin{pmatrix} 3 \\ -2 \end{pmatrix} + \begin{pmatrix} -5 \\ 8 \end{pmatrix} = \begin{pmatrix} -2 \\ 6 \end{pmatrix}$
So the new coordinates of P are $(-2, 6)$.

2. **(Review of previous lesson)**

State the vector that takes (a) $(-6, 1)$ to $(2, 7)$ (b) $(5, 1)$ to $(12, -8)$

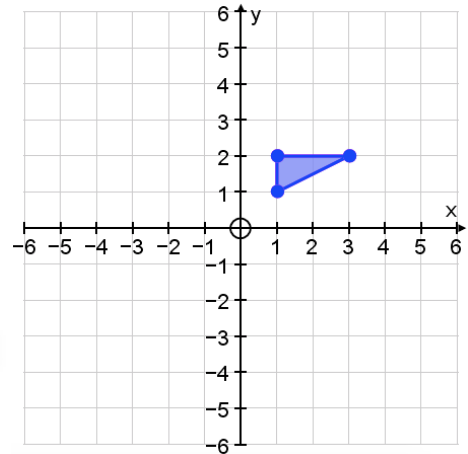
Working: (a) From -6 to 2 is $+8$
From 1 to 7 is $+6$
So the vector is $\begin{pmatrix} 8 \\ 6 \end{pmatrix}$.

(b) From 5 to 12 is $+7$
From 1 to -8 is -9
So the vector is $\begin{pmatrix} 7 \\ -9 \end{pmatrix}$.

E.g. 1 Translating a shape: draw the translation of the **blue** triangle under these vectors

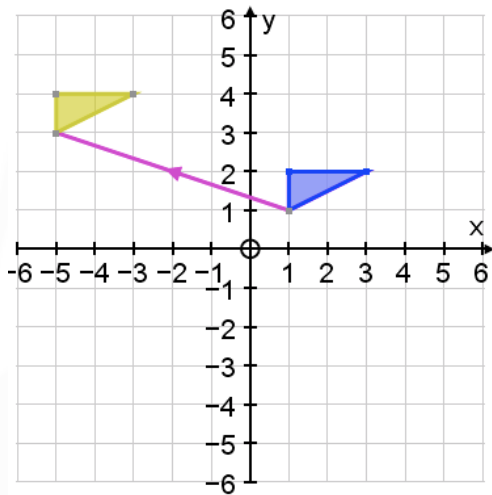
(a) $\begin{pmatrix} -6 \\ 2 \end{pmatrix}$

(b) $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$

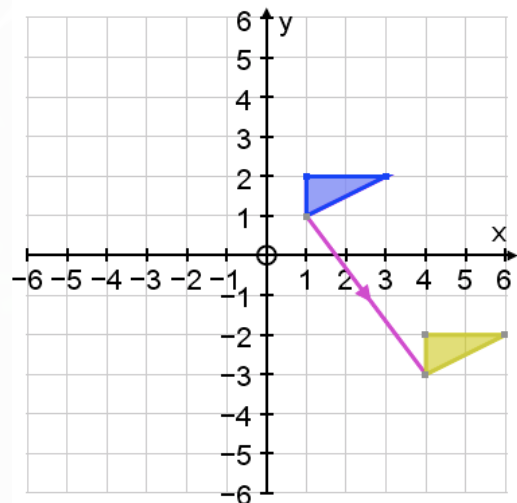


Working: Make sure you include the direction of the vector.
The **blue** triangle is the object and the **yellow** triangle is the image.

(a) The pink line is the vector $\begin{pmatrix} -6 \\ 2 \end{pmatrix}$

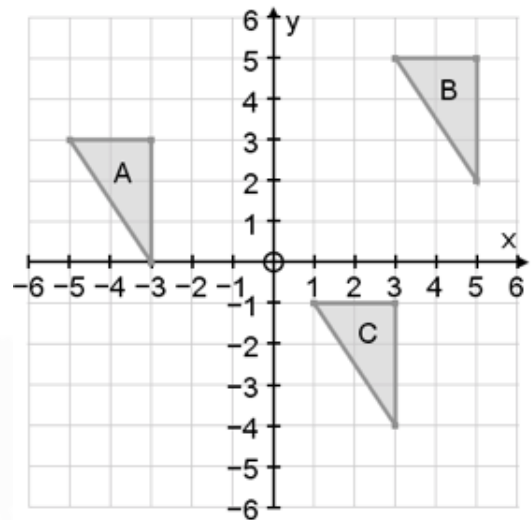


(b) The pink line is the vector $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$



E.g. 2 Write down the column vector that transforms:

- (a) A to B
- (b) C to B
- (c) A to C
- (d) C to A



What do you notice about your answers to (c) and (d)?

Working: (a) Draw a line between corresponding points on A and B , say $(-3, 0)$ and $(5, 2)$.
Draw an arrow on the line to show direction — in this case, the arrow should point from A to B .
Describe the vector using a column vector.

Answer = $\begin{pmatrix} 8 \\ 2 \end{pmatrix}$ i.e. the vector goes 8 to the right and 2 up.

(b) Draw a line between corresponding points on C and B , say $(3, -4)$ and $(5, 2)$.
Draw an arrow on the line to show direction — in this case, the arrow should point from C to B .
Describe the vector using a column vector.

Answer = $\begin{pmatrix} 2 \\ 6 \end{pmatrix}$ i.e. the vector goes 2 to the right and 6 up.

(c) Draw a line between corresponding points on A and C , say $(-3, 3)$ and $(3, 1)$.
Draw an arrow on the line to show direction — in this case, the arrow should point from A to C .
Describe the vector using a column vector.

Answer = $\begin{pmatrix} 6 \\ -4 \end{pmatrix}$ i.e. the vector goes 6 to the right and 4 down.

(d) Answer = $\begin{pmatrix} -6 \\ 4 \end{pmatrix}$ i.e. the vector goes 6 to the left and 4 up.

What do you notice about the answers to (c) and (d)?

One vector is the negative version of the other i.e. $\begin{pmatrix} 6 \\ -4 \end{pmatrix} = - \begin{pmatrix} -6 \\ 4 \end{pmatrix}$

Video: [Translations 1](#)
Video: [Translations 2](#)

[Solutions to Starter and E.g.s](#)

Exercise

9-1 class textbook:	p278 M9.3 Qu 1-2
A*-G class textbook:	p237 M9.3 Qu 1-3
9-1 homework book:	p95 M9.3 Qu 1-2
A*-G homework book:	p67 M9.3 Qu 1-2

[Homework book answers \(only available during a lockdown\)](#)

