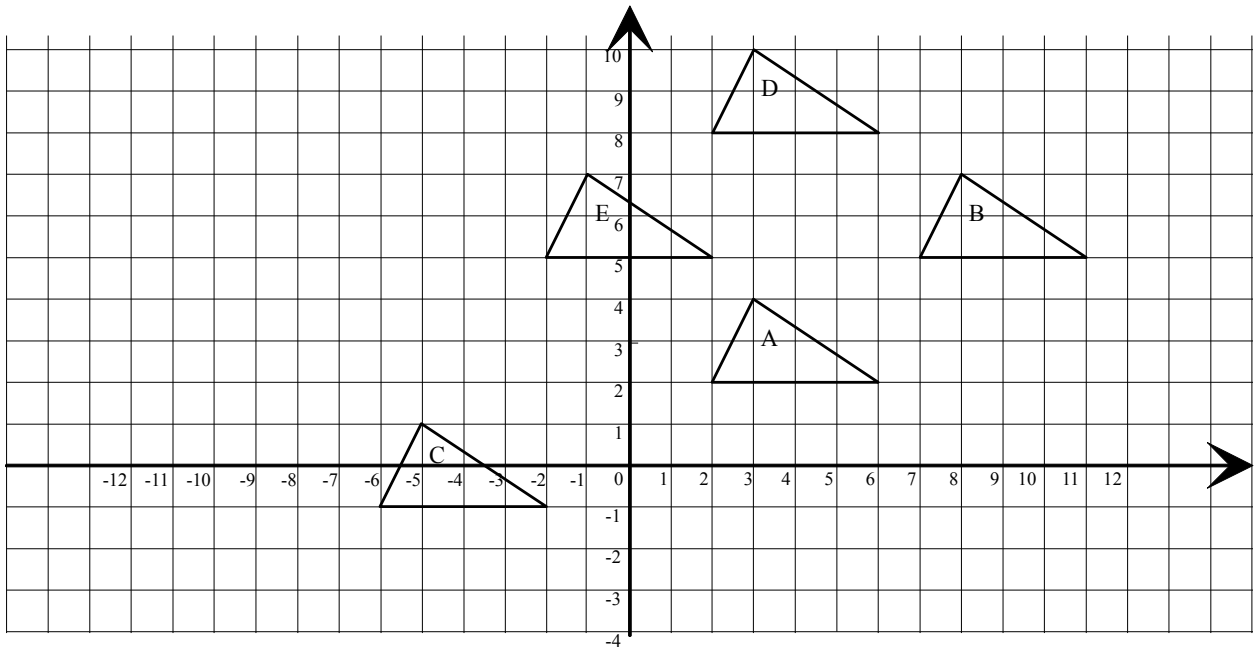


Transformations I - Translations



1) This question refers to the diagram above. Using a column vector, state what transformation would take:

- (a) A onto B (b) A onto E (c) A onto D (d) A onto C
 (e) C onto E (f) E onto C (g) B onto E (h) E onto A

2) Draw x and y axes numbered from -12 to 12 on each axis. Plot the quadrilateral B with vertices at (3,2), (6,3), (5,5) and (3,4). Draw and label the following triangles:

- P: the image of B after translation $\begin{pmatrix} 3 \\ 5 \end{pmatrix}$ Q: the image of B after translation $\begin{pmatrix} -8 \\ -6 \end{pmatrix}$
 R: the image of B after translation $\begin{pmatrix} -6 \\ 2 \end{pmatrix}$ S: the image of B after translation $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$

3) Draw x and y axes numbered from -12 to 12 on each axis. Draw the triangle T with vertices at (-1, -2), (3, -2) and (3, -4).

(a) Draw and label the following triangles:

- P: the image of T after translation $\begin{pmatrix} 7 \\ -2 \end{pmatrix}$ Q: the image of T after translation $\begin{pmatrix} -5 \\ 6 \end{pmatrix}$
 R: the image of P after translation $\begin{pmatrix} -5 \\ 6 \end{pmatrix}$ S: the image of Q after translation $\begin{pmatrix} 7 \\ -2 \end{pmatrix}$

(b) Does $\begin{pmatrix} 7 \\ -2 \end{pmatrix}$ followed by $\begin{pmatrix} -5 \\ 6 \end{pmatrix}$ have the same effect as $\begin{pmatrix} -5 \\ 6 \end{pmatrix}$ followed by $\begin{pmatrix} 7 \\ -2 \end{pmatrix}$?

(c) What single translation would have the same effect as $\begin{pmatrix} 7 \\ -2 \end{pmatrix}$ followed by $\begin{pmatrix} -5 \\ 6 \end{pmatrix}$?

(d) How could you have got the answer to (c) without even needing to draw a diagram? Can you make a rule which tells you the combined effect of any two translations $\begin{pmatrix} a \\ b \end{pmatrix}$ followed by $\begin{pmatrix} c \\ d \end{pmatrix}$?