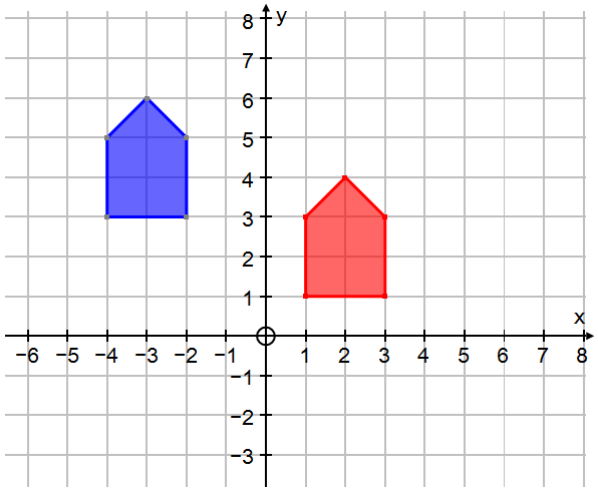
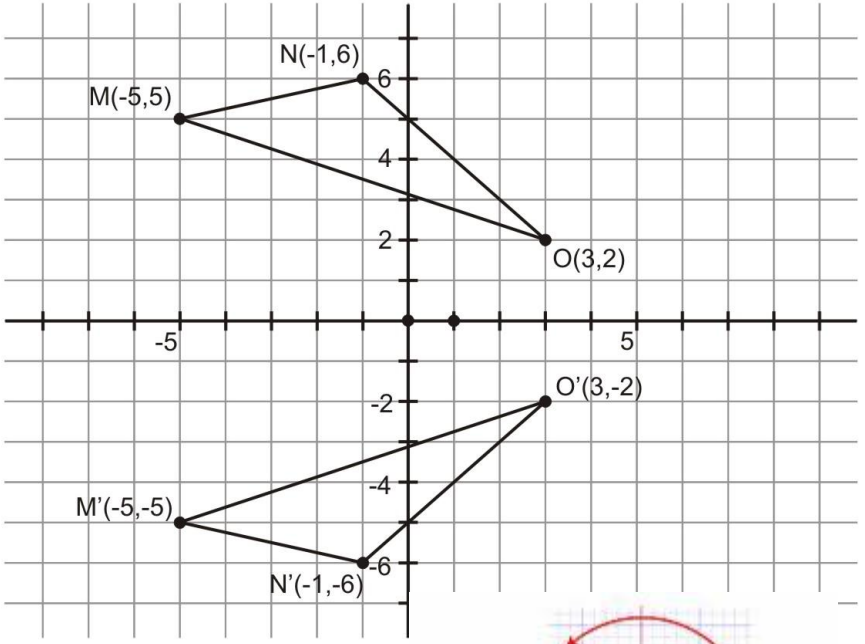
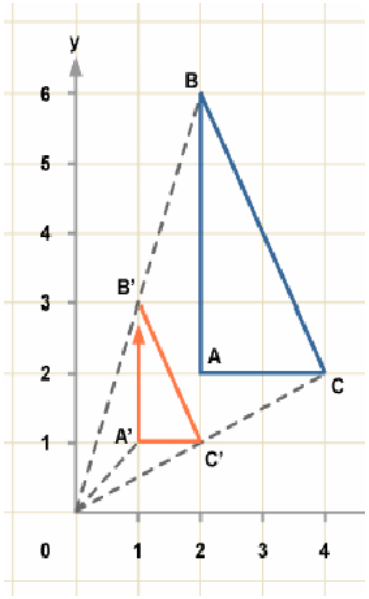
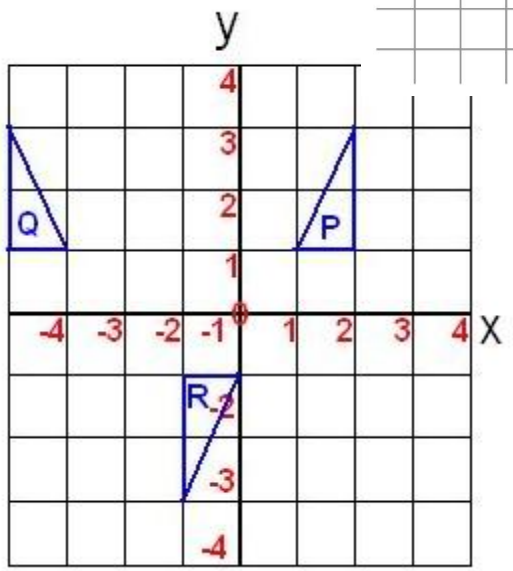
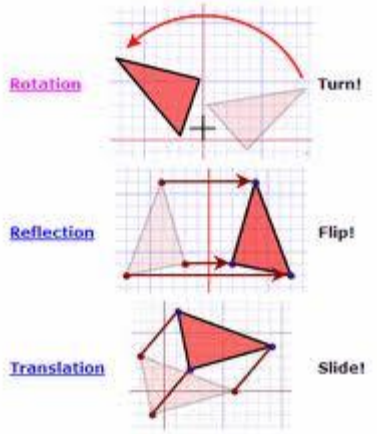
Transformations Challenges





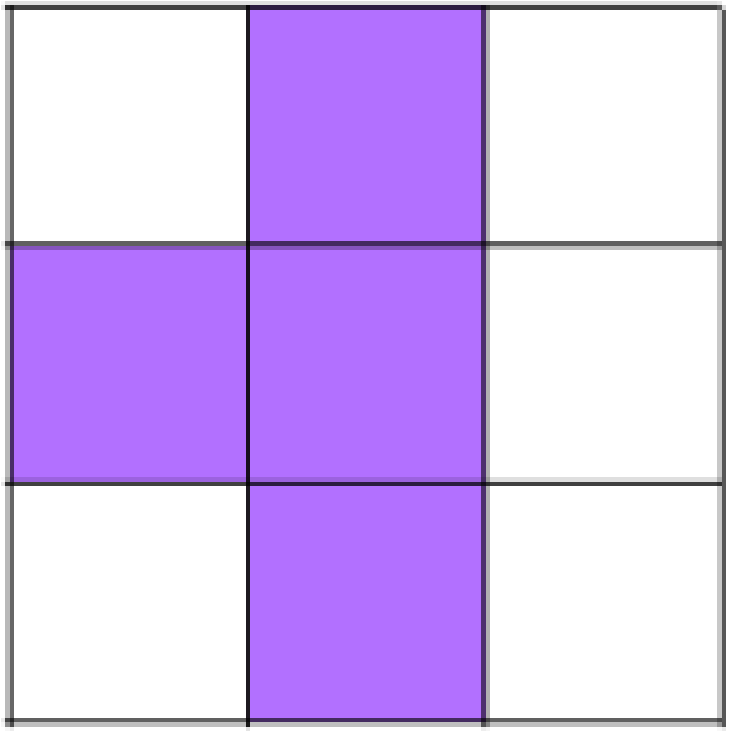






Challenge 1

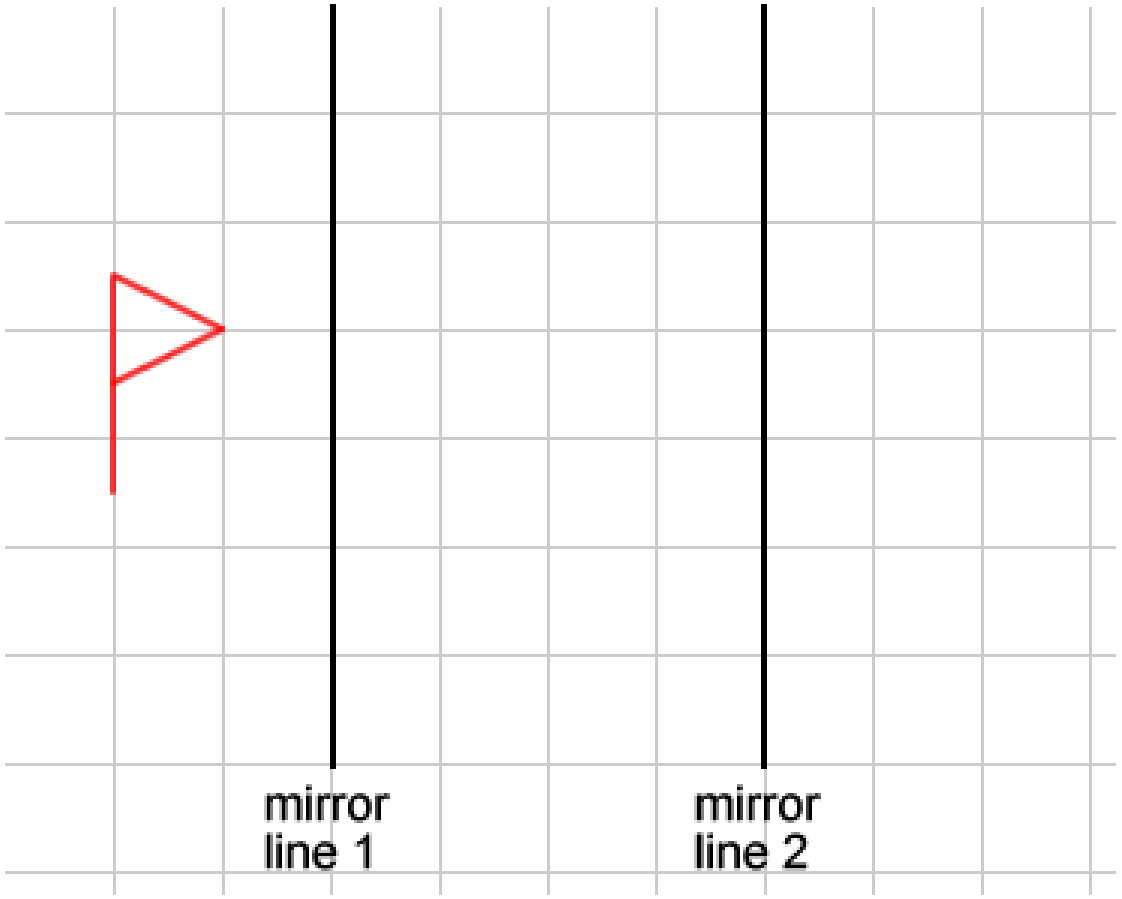
How many different symmetrical patterns can you make by colouring in squares?



http://nrich.maths.org/1868

Challenge 2

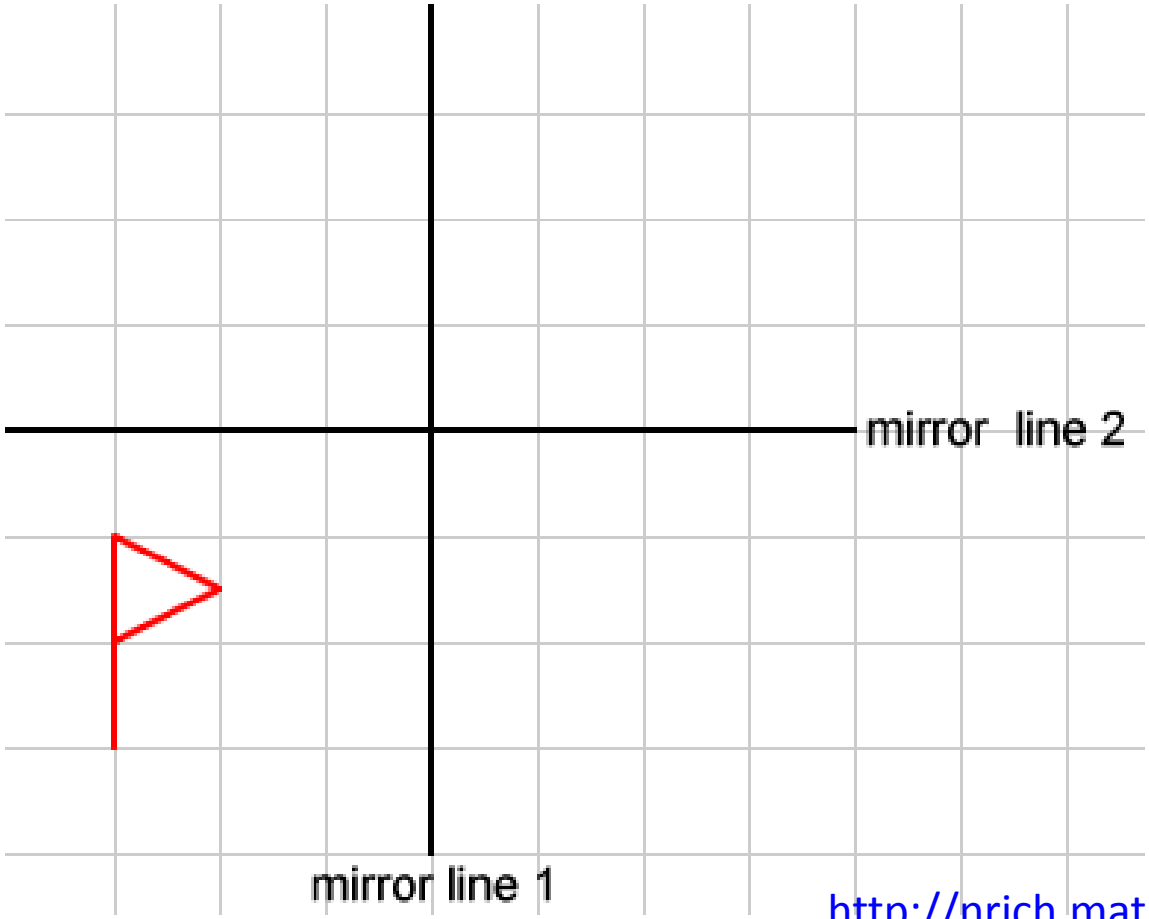
Reflect the flag in the left-hand line, and then reflect the image you obtain in the right-hand line. Can you describe the single transformation that takes the first flag to the last flag?



http://nrich.maths.org/5458/index

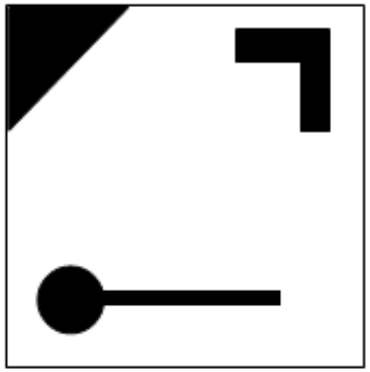
Challenge 3

Reflect the flag in one of the lines. Reflect the resulting image in the other line. Can you describe the single transformation you would need to get from the first flag to the last flag?



http://nrich.maths.org/5459/index

Challenge 4

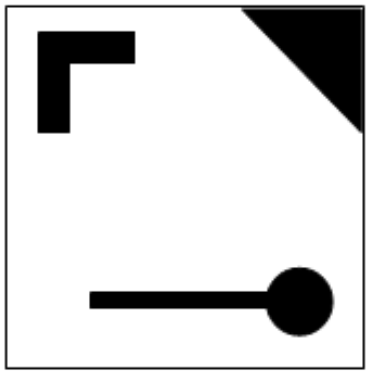


The tile has been rotated. Which of the pictures below is the same tile?

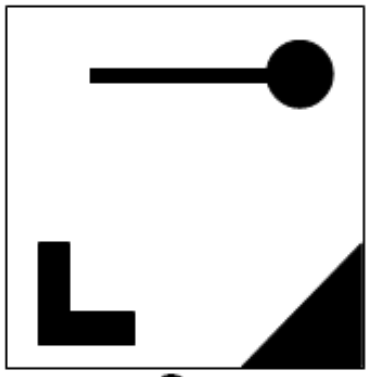
.....

How far and in what direction has it been rotated?

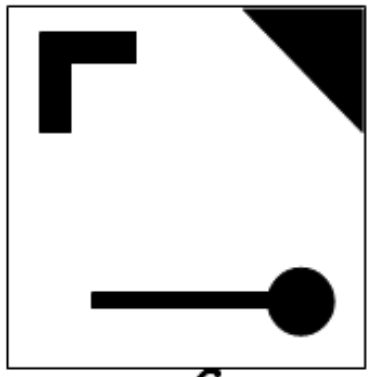
.....



A



B



C

Challenge 5

Answer the question and then translate the blue shape using the other vectors

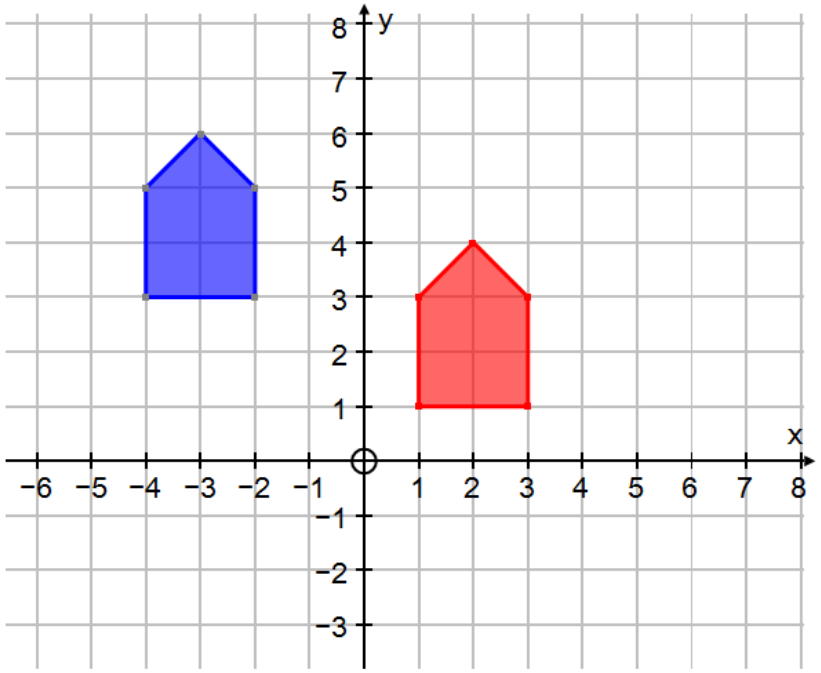
The blue object has been translated by what vector to produce the red image?

A. $\begin{pmatrix} 3 \\ 0 \end{pmatrix}$

B. $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$

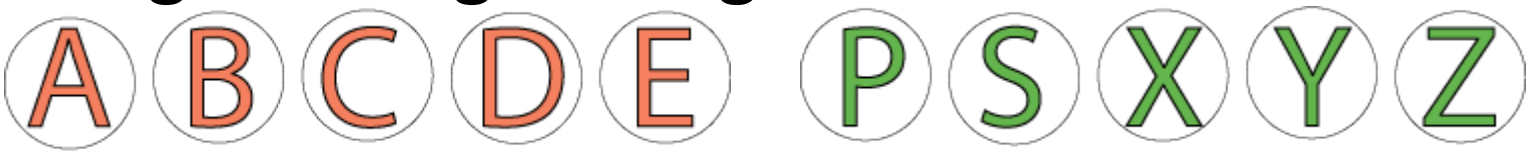
C. $\begin{pmatrix} 5 \\ 2 \end{pmatrix}$

D. $\begin{pmatrix} -2 \\ 5 \end{pmatrix}$



Challenge 6

Can you position the ten letters on a 4 by 4 grid using the eight clues below?



The letters at $(1, 1)$, $(1, 2)$ and $(1, 3)$ are all symmetrical about a vertical line.

The letter at $(4, 2)$ is not symmetrical in any way.

The letters at $(1, 1)$, $(2, 1)$ and $(3, 1)$ are symmetrical about a horizontal line.

The letters at $(0, 2)$, $(2, 0)$ have rotational symmetry.

The letter at $(3, 1)$ consists of just straight lines.

The letters at $(3, 3)$ and $(2, 0)$ consist of just curved lines.

The letters at $(3, 3)$, $(3, 2)$ and $(3, 1)$ are consecutive in the alphabet.

The letters at $(0, 2)$ and $(1, 2)$ are at the two ends of the alphabet.

http://nrich.maths.org/5038

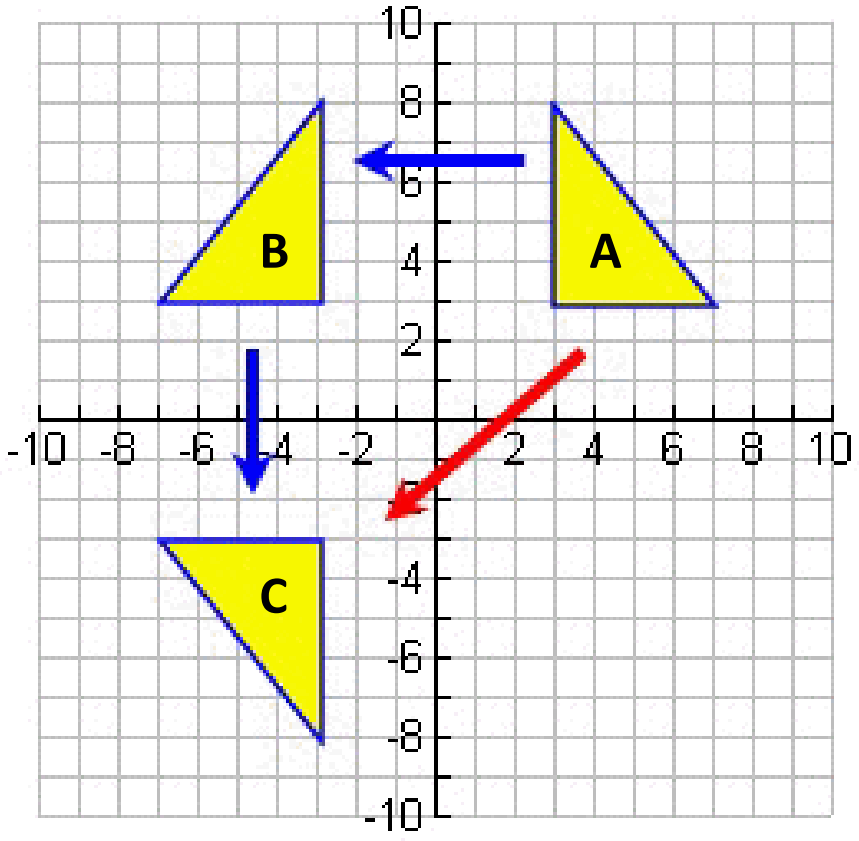
Challenge 7

Describe the transformations that move the triangle from:

A to B

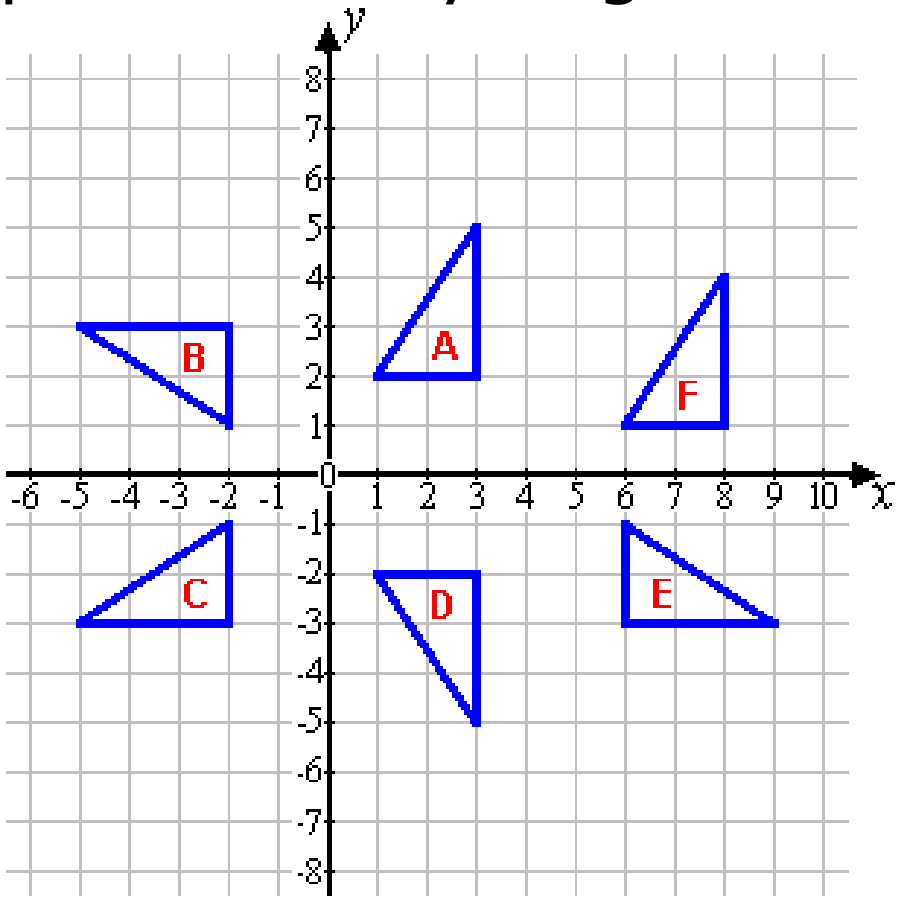
B to C

A to C



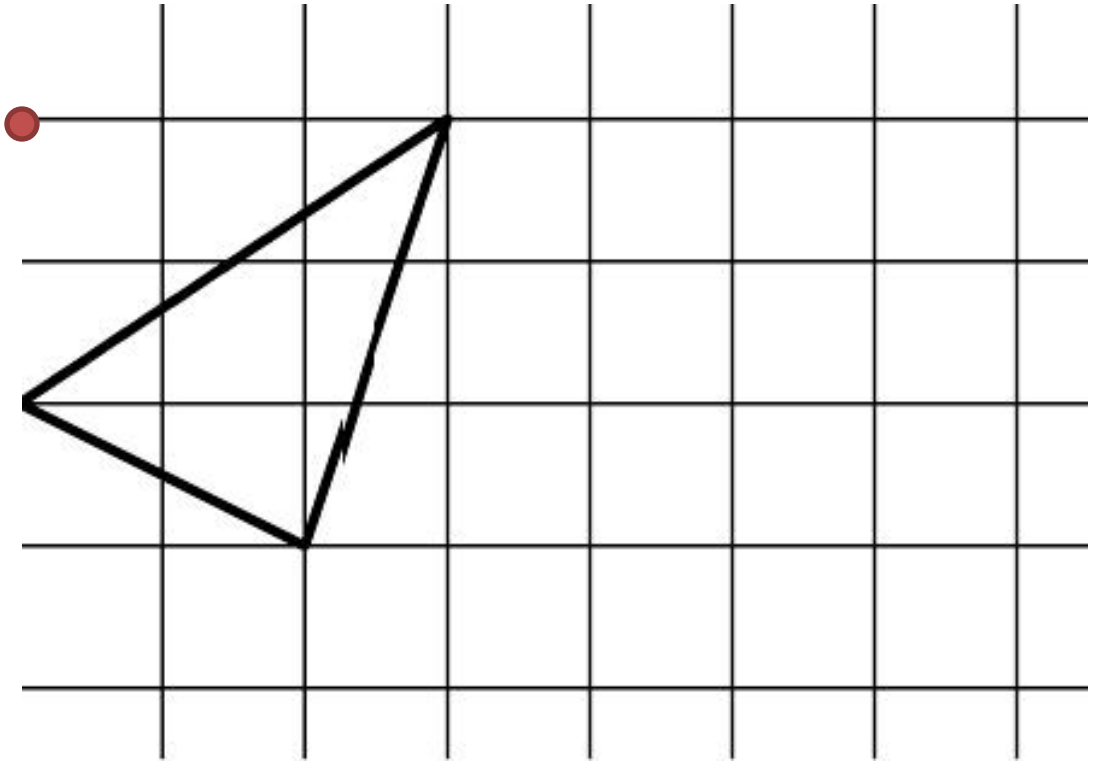
Challenge 8

Describe six transformations that move the triangle from one position to another: For example how do you get from A to D?



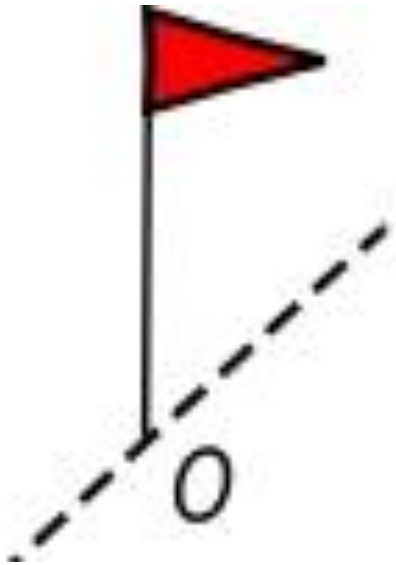
Challenge 9

Copy the shape below and rotate it by 90^0 clockwise and 180^0 degrees using the blue dot as the centre of enlargement



Challenge 10

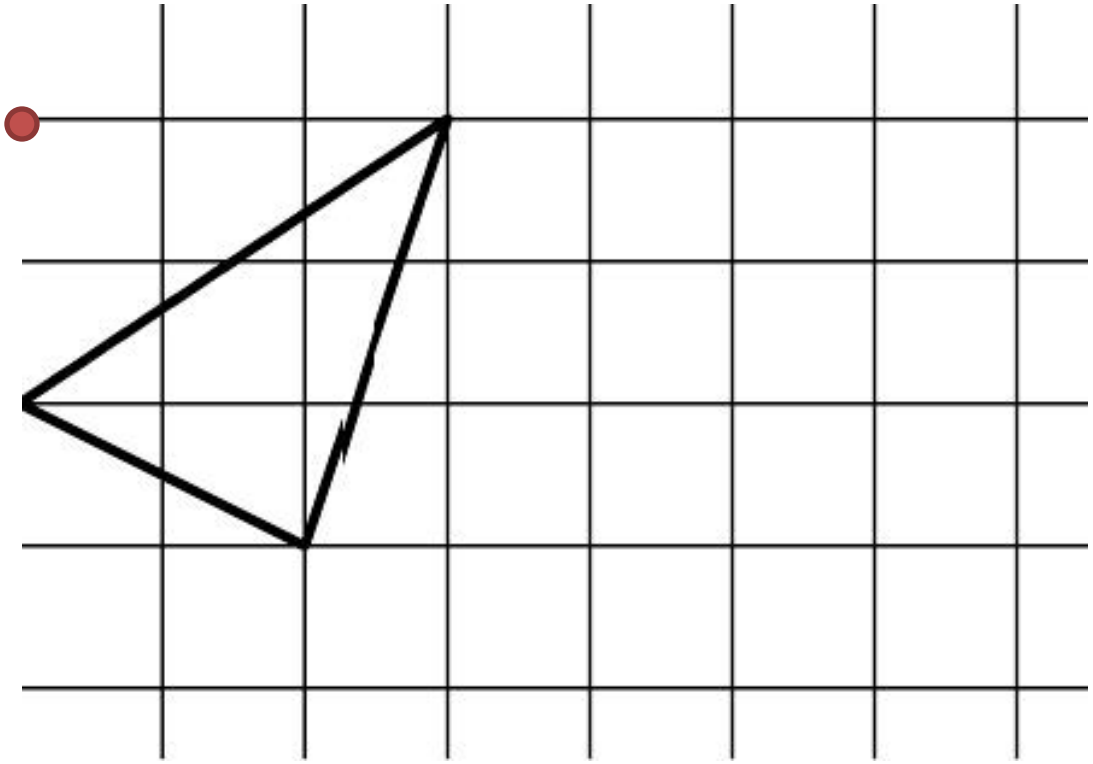
The flag is given a half-turn anticlockwise about the point O and then is reflected in the dotted line. What is the final position of the flag?



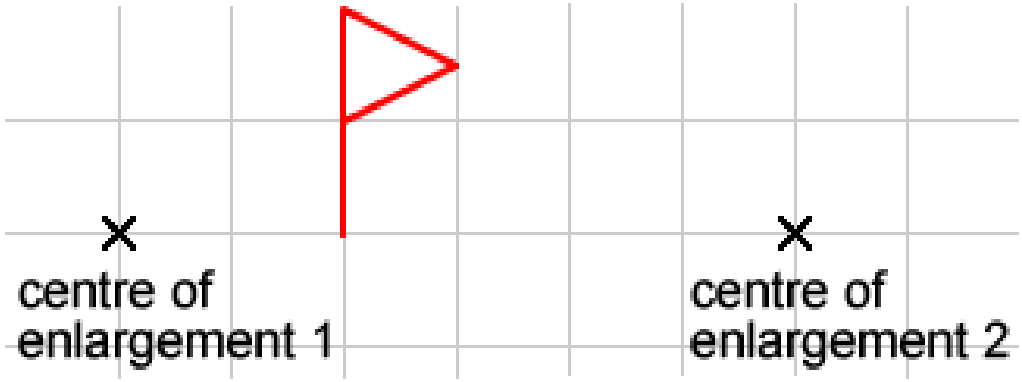
http://nrich.maths.org/6198

Challenge 11

Copy the shape below and enlarge by a scale factor of 2 using the blue dot as the centre of enlargement



Challenge 12

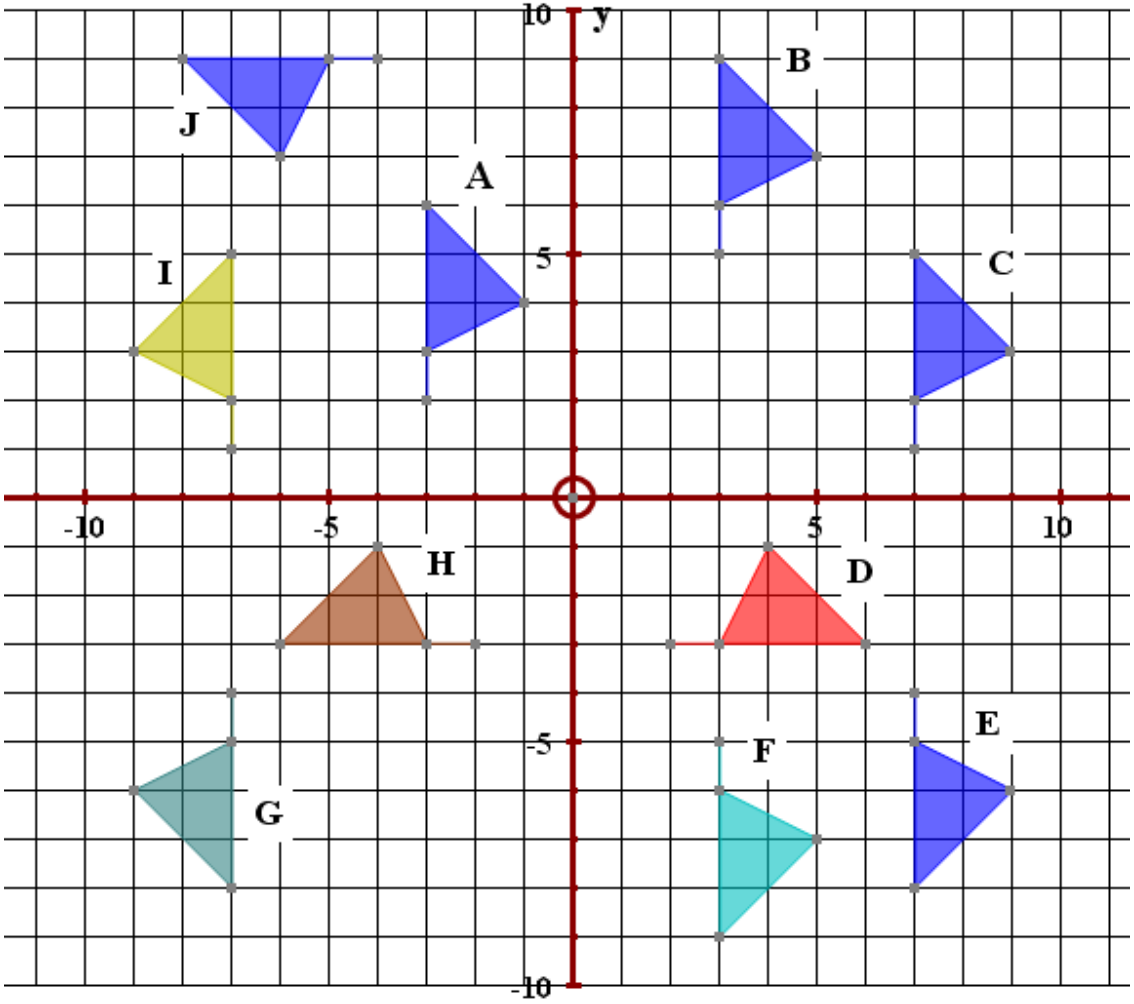


Enlarge the flag by a scale factor of 2 about the first centre of enlargement. Now enlarge the resulting flag by a scale factor of $\frac{1}{2}$ about the second centre of enlargement. Can you find a single transformation that takes the first flag to the last flag?

http://nrich.maths.org/5461

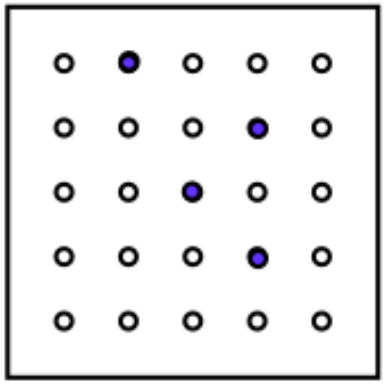
Challenge 13

Identify the transformations that move shape A to each of the other triangles

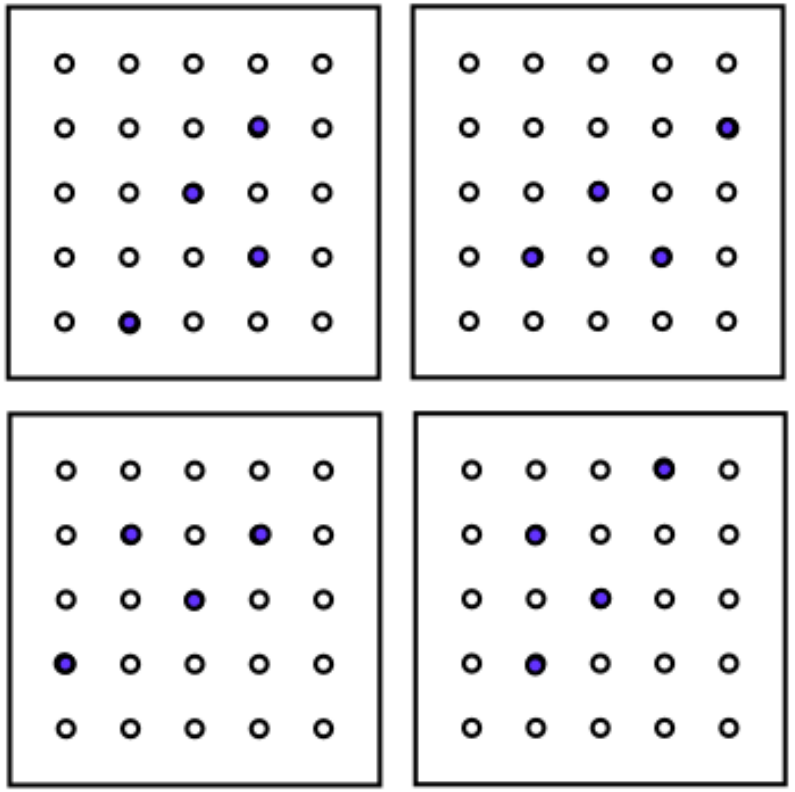


Challenge 14

Here we have a kind of peg board. The holes go all the way through so the pegs may be seen from the top or underneath.



Starting with the board like this: what do you have to do to get each of these 4 views?



http://nrich.maths.org/5563