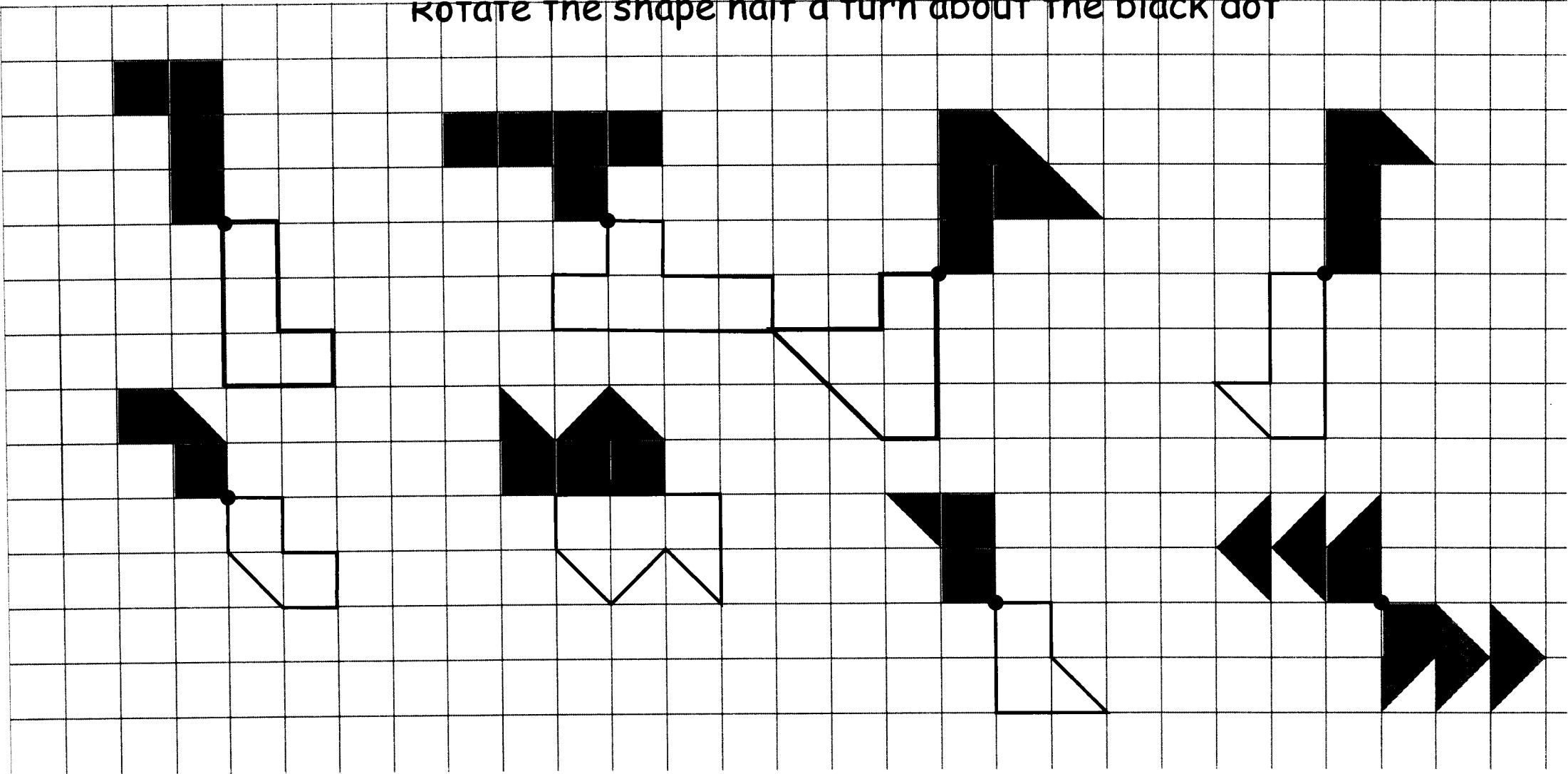


## TRANSFORMATIONS

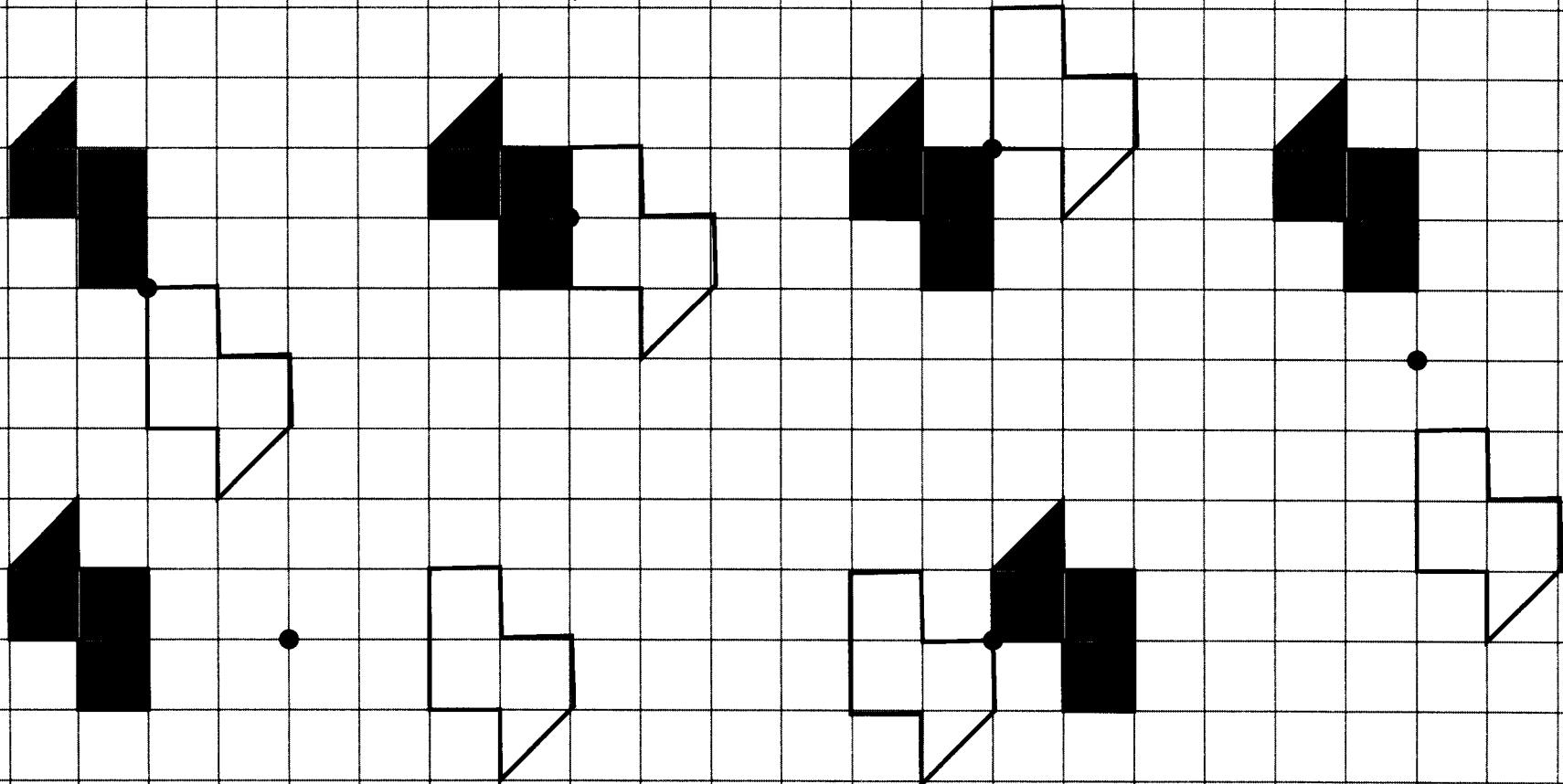
Page	Description
1	Rotations through $180^\circ$
2	Rotations through $180^\circ$
3	Translations
4	Enlargements
5	Reflections
6	Reflections on a grid with a diagonal mirror line
7	Mixed reflection, rotation and translation on a grid
8	Number of lines of symmetry and order of rotational symmetry
9	Enlargements on a grid with a centre of enlargement and a positive whole number scale factor
10	Enlargements on a grid with a centre of enlargement and a negative and/or fractional scale factor
11	Mixed reflection, rotation, enlargement and translation on a grid

ROTATE THE SHAPE HALF A TURN ABOUT THE BLACK DOT



①

Rotate the shape half a turn about the black dot

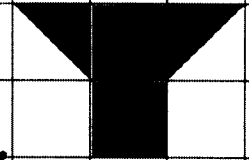
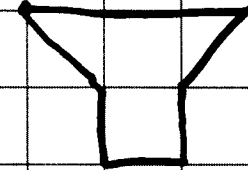
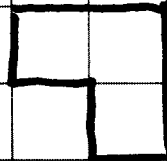
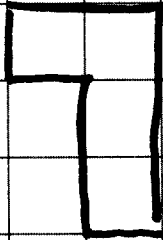
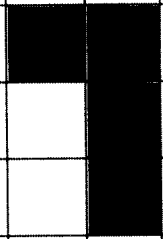


2

# Translation Worksheet

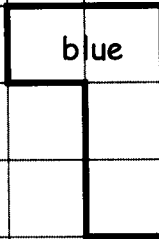
+ right, - left

+ up, - down



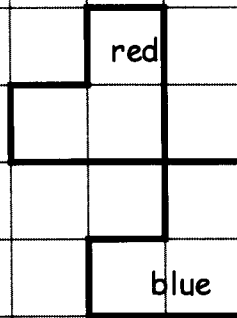
Translate this shape by the vector

$$\begin{bmatrix} 3 \\ 1 \end{bmatrix}$$



Translate this shape by the vector

$$\begin{bmatrix} 0 \\ 3 \end{bmatrix}$$



Translate this shape by the vector

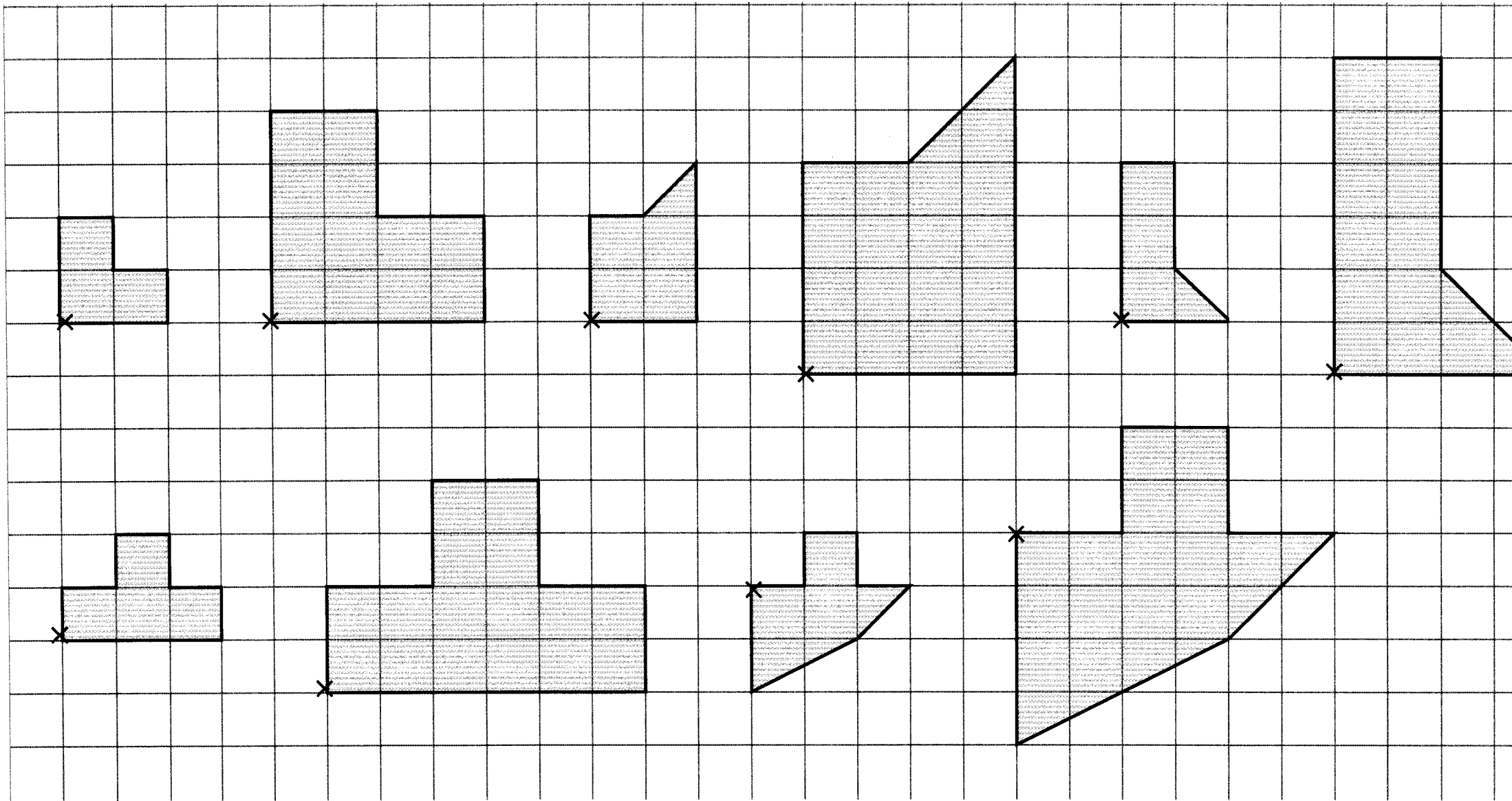
$$\begin{bmatrix} -3 \\ -2 \end{bmatrix}$$



$$\begin{bmatrix} -5 \\ -2 \end{bmatrix}$$



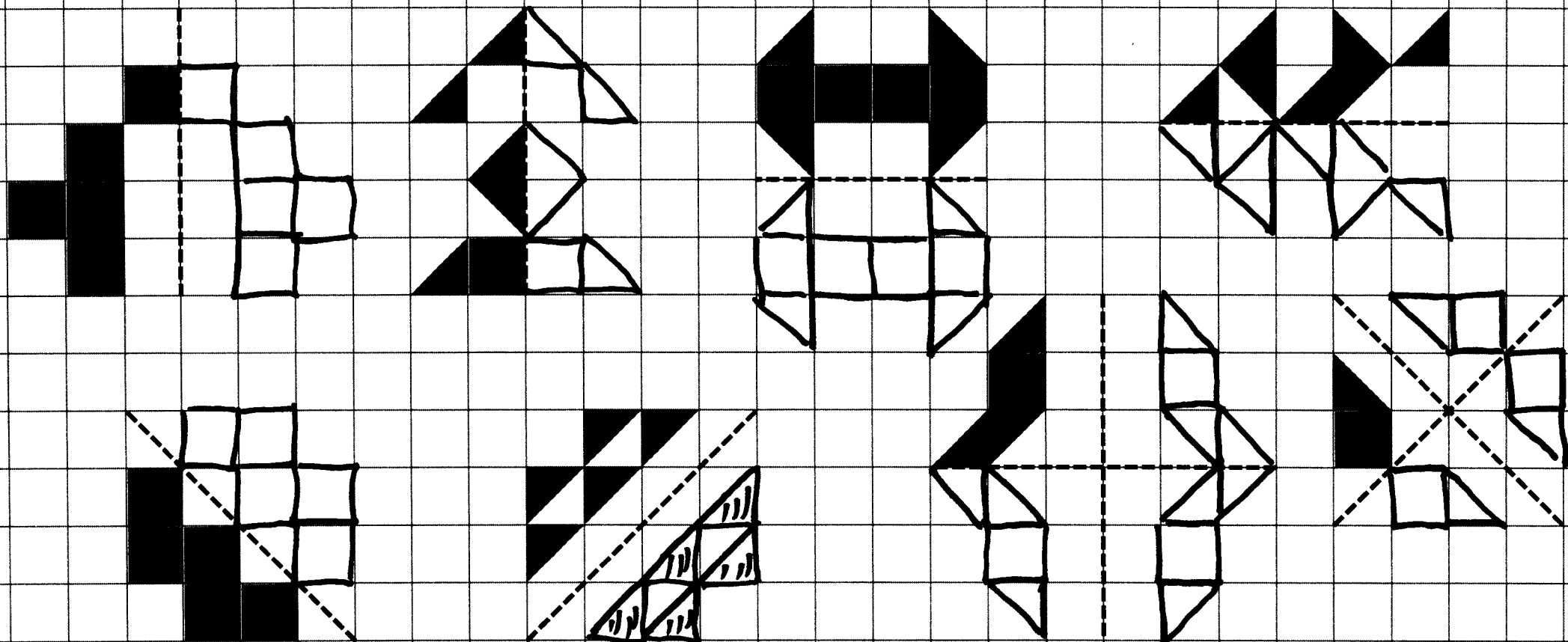
Colour the red shape red and the blue shape blue. Describe the translation, using a vector, moving from the red shape to the blue shape.



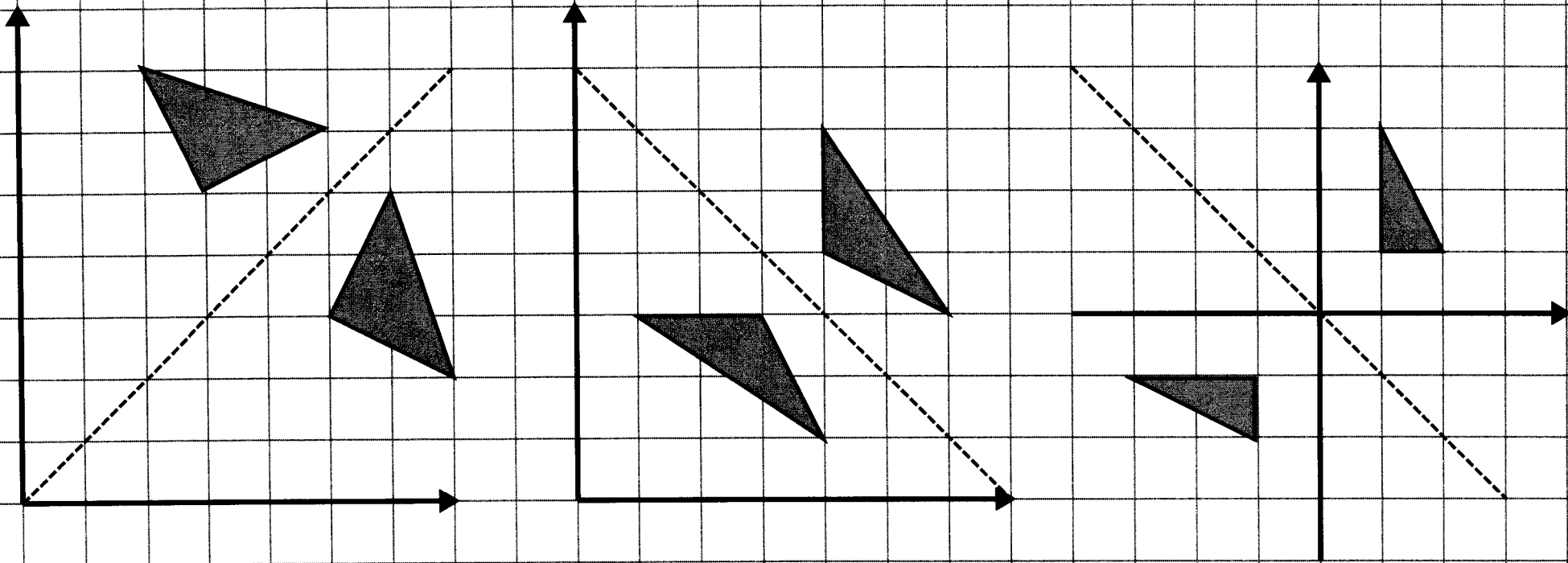
Enlargement - Enlarge each of these shapes by scale factor 2 Start at the "x"

(4)

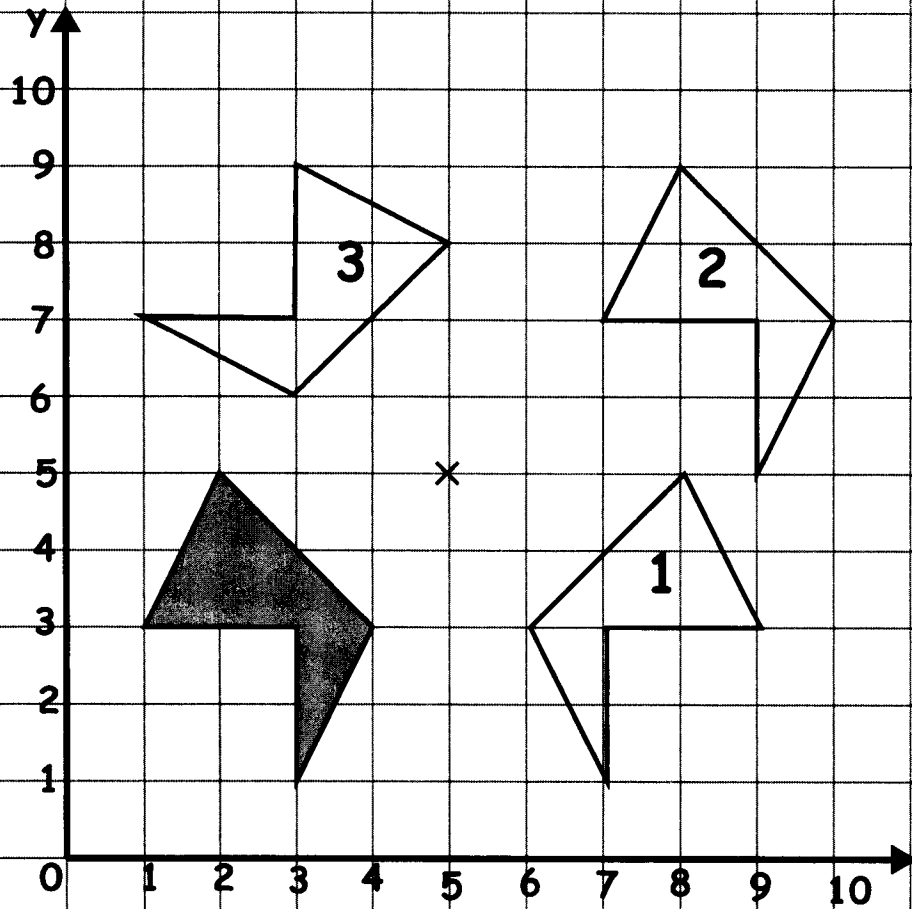
Reflect these shapes in the mirror line



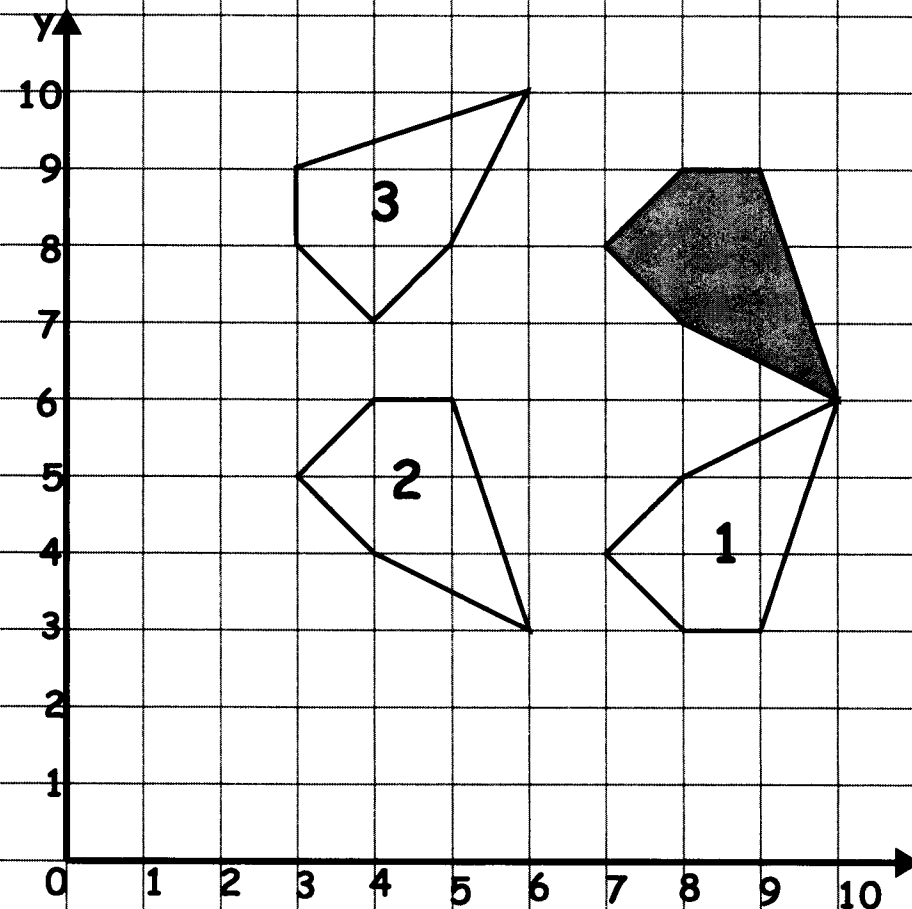
Reflect the triangles in the diagonal mirror lines



6

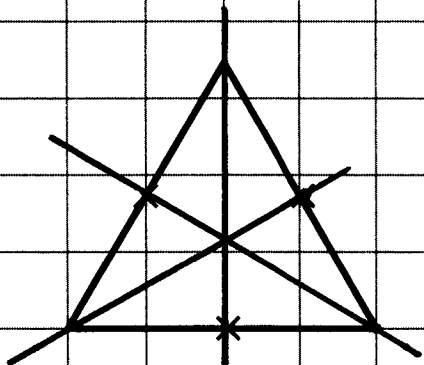


- 1) Reflect the original shape in  $x = 5$
- 2) Translate the original shape 6 right, 4 up.
- 3) Rotate the original shape 90 degrees clockwise about the point (5,5)



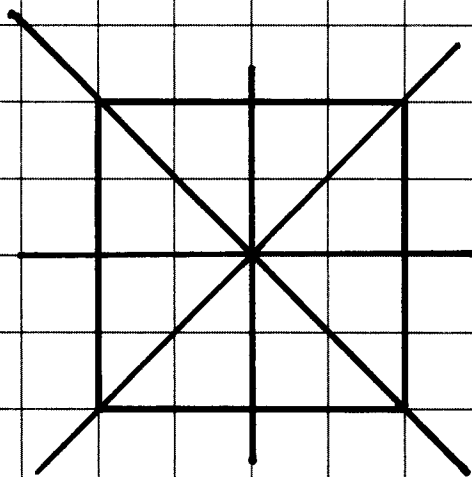
- 1) Reflect the original shape in  $y = 6$
- 2) Translate the original shape 4 left, 3 down.
- 3) Rotate the original shape 90 degrees anticlockwise about the point (6,6)





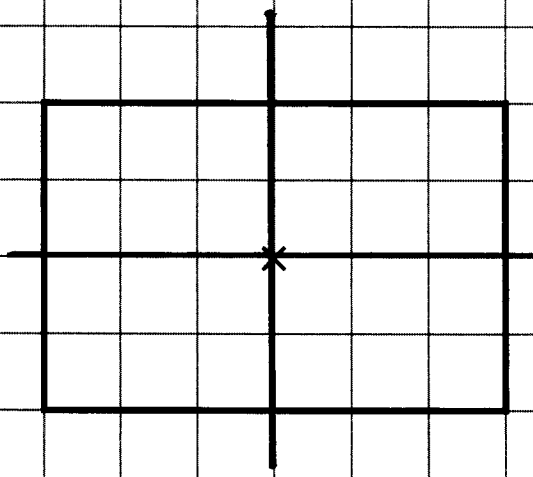
Lines of symmetry = 3

Order of rotational symmetry = 3



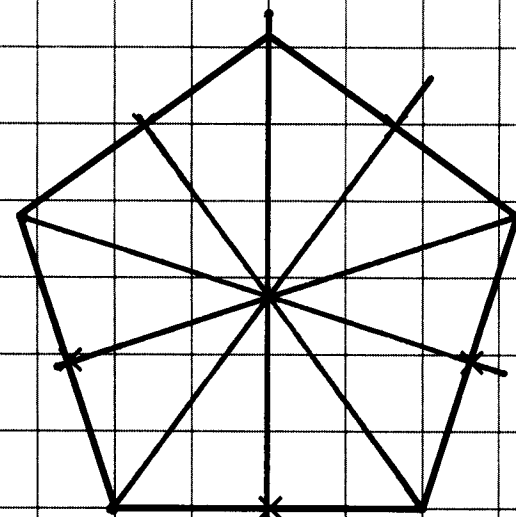
Lines of symmetry = 4

Order of rotational symmetry = 4



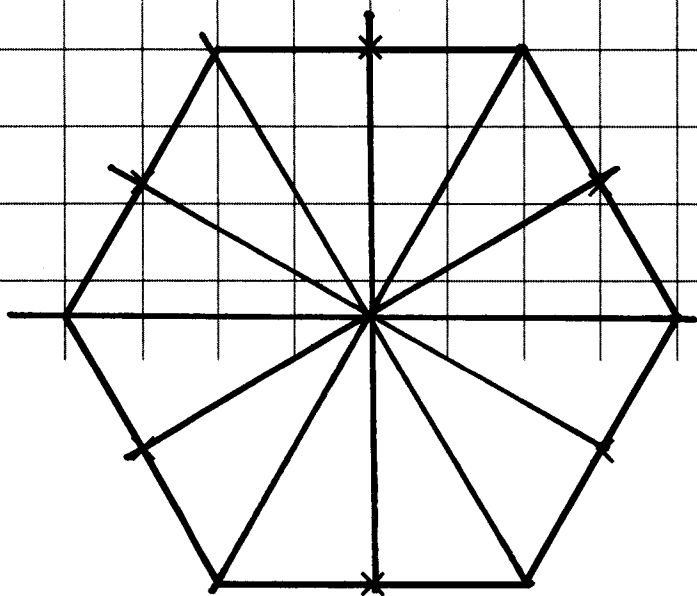
Lines of symmetry = 2

Order of rotational symmetry = 2



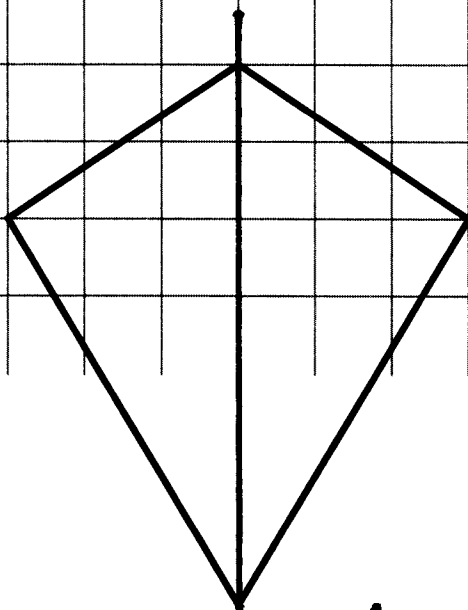
Lines of symmetry = 5

Order of rotational symmetry = 5



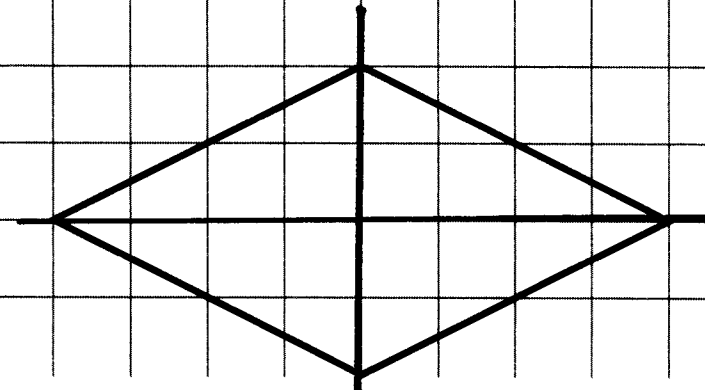
Lines of symmetry = 6

Order of rotational symmetry = 6



Lines of symmetry = 1

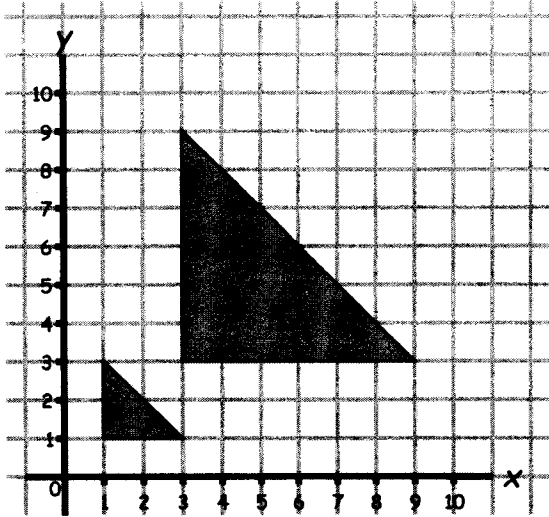
Order of rotational symmetry = 1



Lines of symmetry = 2

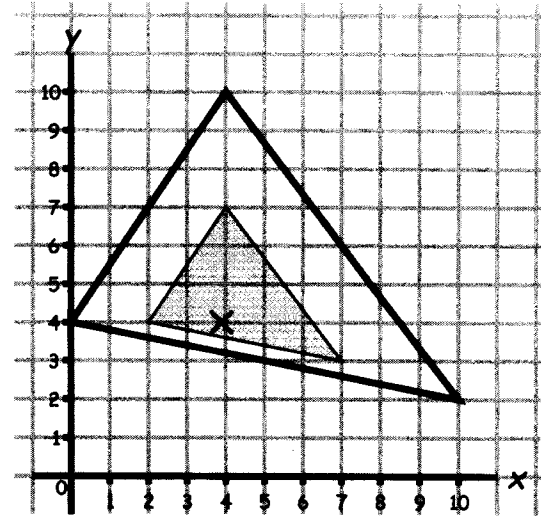
Order of rotational symmetry = 2

⑧



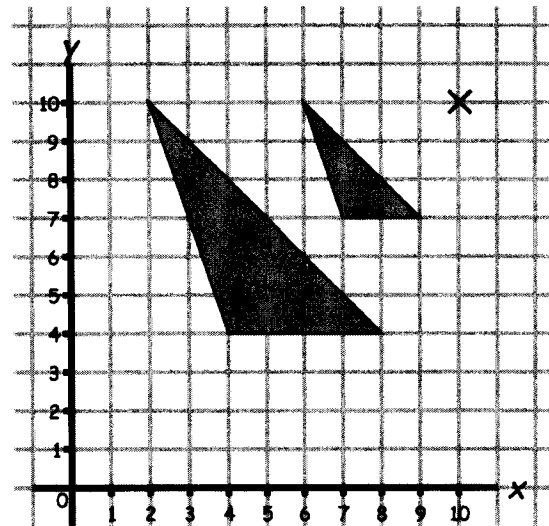
Plot the points (1,1) (3,1) and (1,3). Join them to make triangle.

Enlarge this triangle by a scale factor 3, centre of enlargement (0,0)



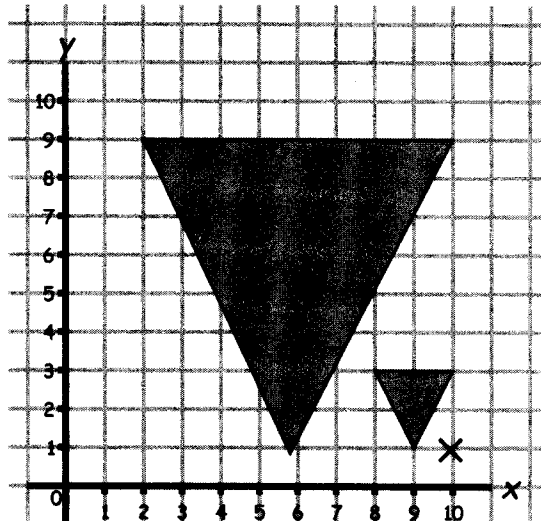
Plot the points (2,4) (7,3) and (4,7). Join them to make triangle.

Enlarge this triangle by a scale factor 2, centre of enlargement (4,4)



Plot the points (6,10) (9,7) and (7,7). Join them to make triangle.

Enlarge this triangle by a scale factor 2, centre of enlargement (10,10)



Plot the points (9,1) (10,3) and (8,3). Join them to make triangle.

Enlarge this triangle by a scale factor 4, centre of enlargement (10,1)