

Chapter 4 § 2

Transformations on the Coordinate Plane

Definition :

Transformation – movements of geometric figures

Preimage – the position of the figure before the transformation

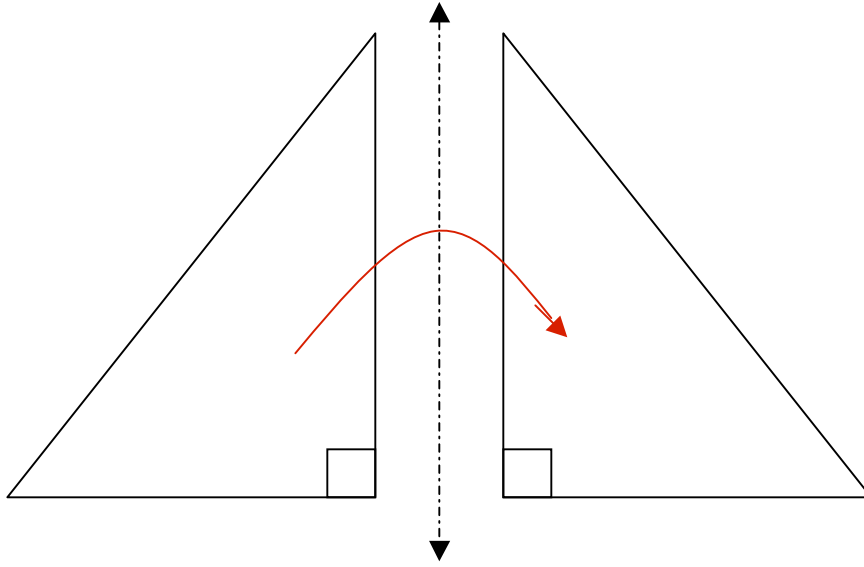
Image – the position of the figure after the transformation

Reflection – a figure is flipped over a line

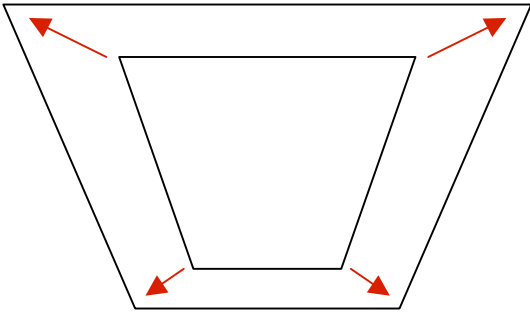
Translation – a figure is slid in any direction

Dilation – a figure is enlarged or reduced

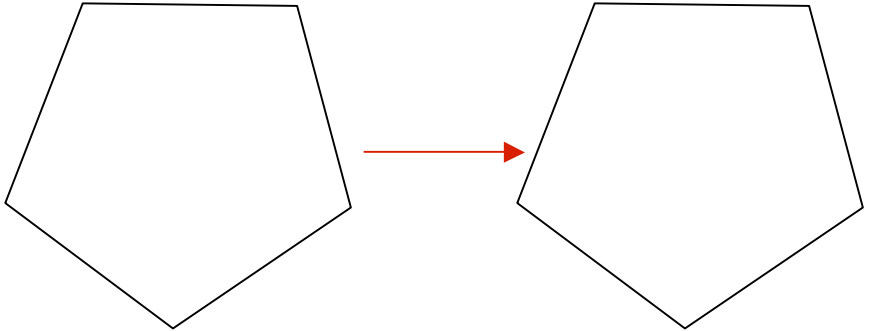
Rotation – a figure is turned around a point



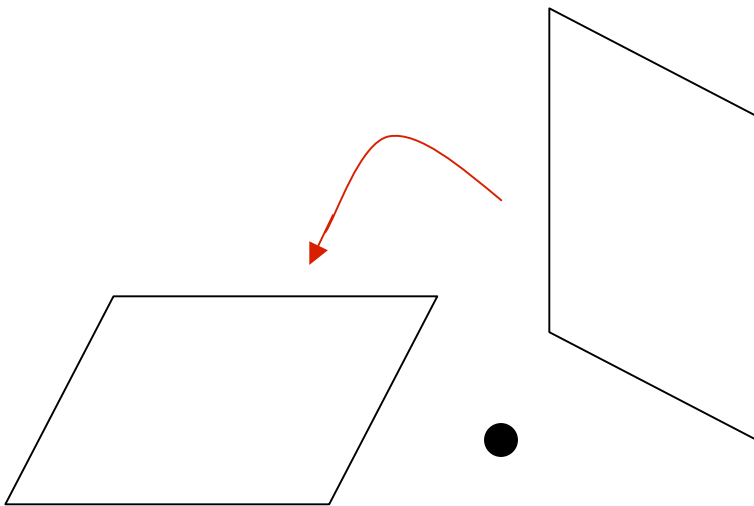
Reflection



Dilation



Translation



Rotation

Name

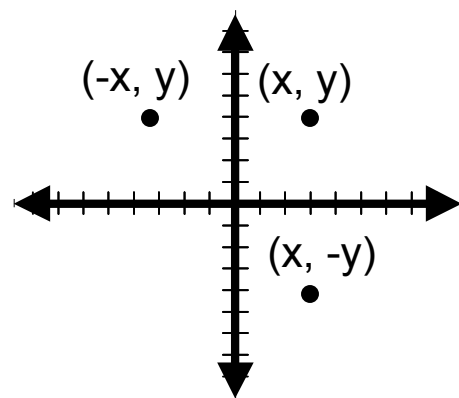
Symbols

Model

Reflection

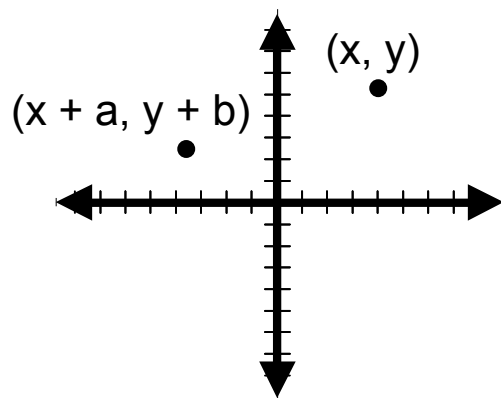
Reflection over x-axis
 $(x, y) \rightarrow (x, -y)$

Reflection over y-axis
 $(x, y) \rightarrow (-x, y)$



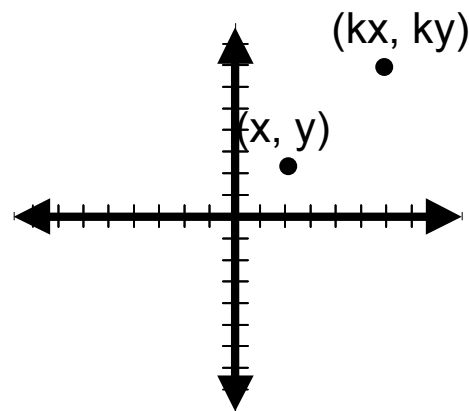
Translation

$(x, y) \rightarrow (x + a, y + b)$



Dilation

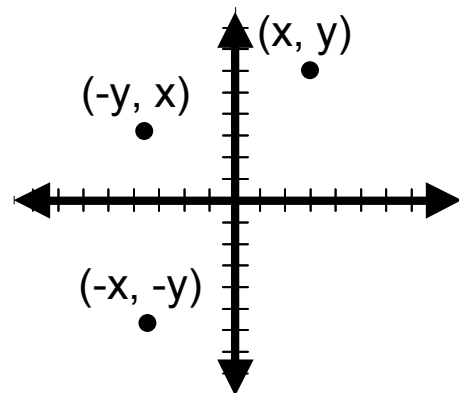
$(x, y) \rightarrow (kx, ky)$



Rotation

90° rotation
 $(x, y) \rightarrow (-y, x)$

180° rotation
 $(x, y) \rightarrow (-x, -y)$



Reflection: (over the x-axis)

$$A (-4, 3) \rightarrow (-4, -3)$$

Translation: (translated 3 units to the left and 2 units down)

$$B (-2, 3) \rightarrow (-2 + -3, 3 + -2) \rightarrow (-5, 1)$$

Dilation: (if the scale factor is $\frac{3}{4}$)

$$C (-4, 1) \rightarrow \left(-4 \cdot \frac{3}{4}, 1 \cdot \frac{3}{4}\right) \rightarrow \left(-3, \frac{3}{4}\right)$$

Rotation: (rotated 90° counter clockwise)

$$D (1, 5) \rightarrow (-5, 1)$$