

Transformations:

Definition: The mapping, or movement, of all points of a figure in a plane according to a common operation

Isometry:

Preserves the congruence of a figure.

Pre-Image (ABCD):

A figure before a transformation has taken place.

Image (A'B'C'D'):

The figure that results from a transformation.

Translation

A transformation that slides each point of a figure the same distance in the same direction.

Translation Vector: $\langle a, b \rangle$

Translation Rule: $(x, y) \rightarrow (x+a, y+b)$

a: horizontal movement

b: vertical movement

Reflection

A transformation of a figure that creates a mirror image, or flips the figure, over a given line.

$$r_{x\text{-axis}}: (x, y) \rightarrow (x, -y)$$

$$r_{y\text{-axis}}: (x, y) \rightarrow (-x, y)$$

$$r_{y=x}: (x, y) \rightarrow (y, x)$$

$$r_{y=-x}: (x, y) \rightarrow (-y, -x)$$

Rotation

A transformation that turns a figure about a fixed point through a given angle and a given direction.

$$R_{-90}: (x, y) \rightarrow (y, -x) \text{ 90 CW}$$

$$R_{90}: (x, y) \rightarrow (-y, x) \text{ 90 CCW}$$

$$R_{180}: (x, y) \rightarrow (-x, -y)$$

Negative angle: CLOCKWISE

Positive angle: COUNTERCLOCKWISE