

4.3 Relate Transformations and Congruence



Thus far we have learned that segments and angles that match exactly are said to be congruent. Same is true for planar figures.

Transformations - Changing the original size, shape or position of a figure to create a new image.

Rigid Transformation - Transformations that do NOT change their shape or size.

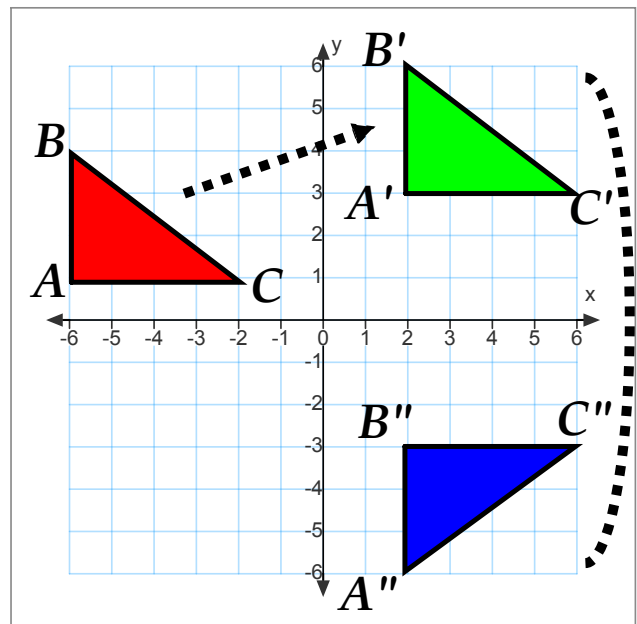
Isometry - The original image and the new image are congruent.

Preimage - Original image.

Image - Transformed or "new" image.

Describing a Transformation (') - A transformed image is named by adding a prime symbol (') to the original name.

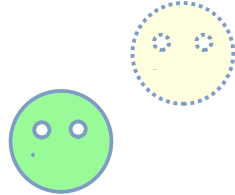
$$\triangle ABC \rightarrow \triangle A'B'C' \rightarrow \triangle A''B''C''$$



4 TYPES OF TRANSFORMATIONS

1. _____
2. _____
3. _____
4. _____

1. **Translation** - Every point moves in a straight line, same distance and same direction. ie. _____



RULES FOR TRANSLATING:

1. $(x+ _, y+ _)$ the translation will be _____ units and _____ units.
2. $(x+ _, y- _)$ the translation will be _____ units and _____ units.
3. $(x- _, y+ _)$ the translation will be _____ units and _____ units.
4. $(x- _, y- _)$ the translation will be _____ units and _____ units.

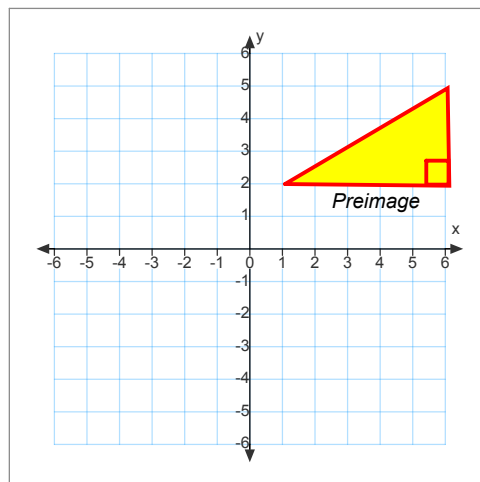
2. **Rotation** - Every point of a figure moves around a given point called the "center of rotation." ie. _____

Three things to know before rotating:

1. **Center of rotation** - the point in which you are performing the rotation.
2. **Angle of rotation** - degree of rotation
3. **Direction** - Clockwise or Counter Clockwise

RULES FOR ROTATIONS:

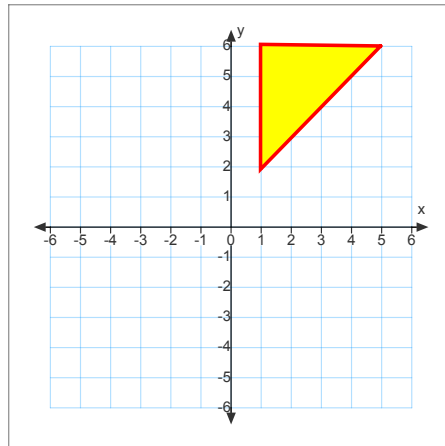
1. 90° about the origin: $R(\text{origin}, 90^\circ): A(x, y) \longrightarrow A'(-y, x)$
2. 180° about the origin $R(\text{origin}, 180^\circ): A(x, y) \longrightarrow A'(-x, -y)$
3. 270° about the origin $R(\text{origin}, 270^\circ): A(x, y) \longrightarrow A'(y, -x)$



3. **Reflection** - Flipping the object over a line called the line of reflection. ie. _____

RULES FOR REFLECTIONS:

1. Reflection over **x-axis**: $A(x, y) \longrightarrow A'(x, -y)$
2. Reflection over **y-axis**: $A(x, y) \longrightarrow A'(-x, y)$
3. Reflection over **y = x**: $A(x, y) \longrightarrow A'(y, x)$
4. Reflection over **y = -x**: $A(x, y) \longrightarrow A'(-y, -x)$



4. **Dilation** - Similar Figures. Dilations are **NOT isometric**.
(We will discuss *Dilations* further in Chapters 6 and 9.)

Things to know before Dilating

1. Scale Factor, n .
 - a. $n > 1$ then it is an _____.
 - b. $n < 1$ then it is a _____.
 - c. $n = 1$ then it _____.
2. Center of Dilation



Preimage



Preimage

