

Geometry

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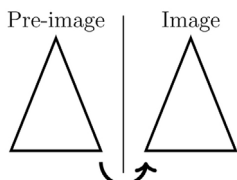
OBJECTIVE 7.1

Learn about geometric transformations like translations (slides), rotations (turns), reflections (flips), and dilations (stretches or shrinks), and recognize how shapes change and move on the coordinate plane

Reflection

“Flips” over a given line

Example:

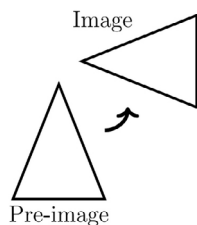


Think about a mirror image!

Rotation

“Turns” about a point

Example:

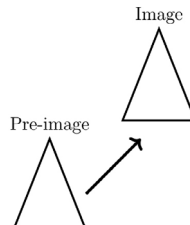


Think about turning a doorknob!

Translation

“Slides” to a new location

Example:



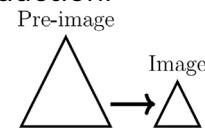
Think about when you slide an object!

Dilation

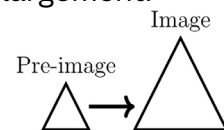
“Enlarges” or “reduces a figure

Example:

Reduction:



Enlargement:



The Dance Routine:

Imagine choreographing a dance routine where dancers represent shapes on a stage (the coordinate plane).



- **Translation:** Dancers slide from one spot to another.
- **Rotation:** They spin around in place.
- **Reflection:** Dancers mirror each other's moves across the center stage.
- **Dilation:** The dance formation expands and contracts, like zooming in and out.

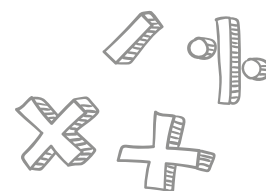
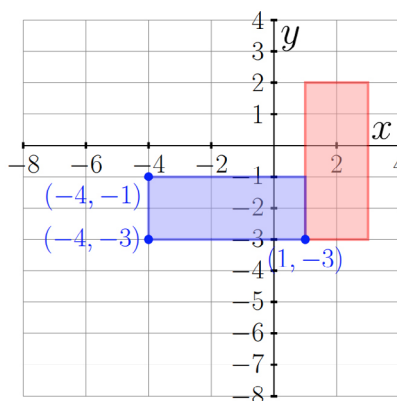
All these transformations come together to create a visually appealing routine.

Rotation Rules:

To rotate 90° : $(x, y) \rightarrow (-y, x)$

To rotate 180° : $(x, y) \rightarrow (-x, -y)$

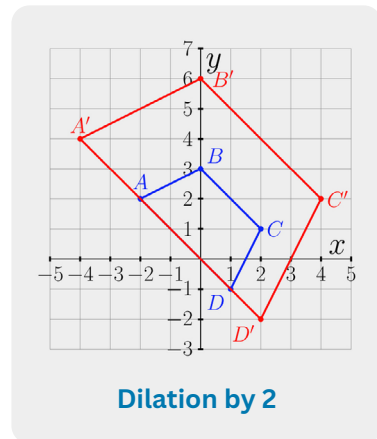
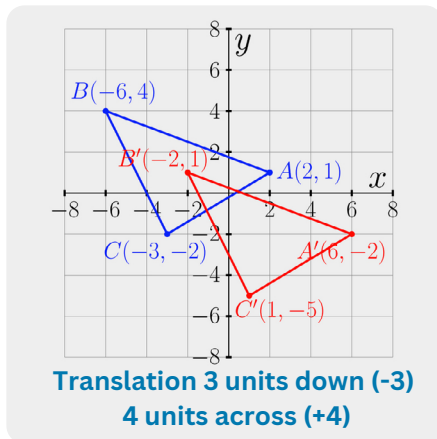
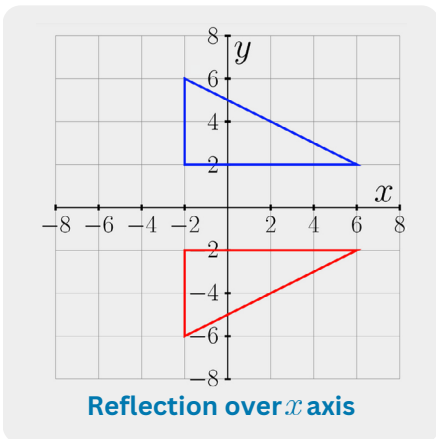
To rotate 270° : $(x, y) \rightarrow (y, -x)$



Geometry

Pre-image: ABC

Image: (denoted by prime notations): $A'B'C'$



How-To:

- Translation:** Think of it as sliding a shape without turning or flipping it. (*left/ right and up/down*)
 - For instance, slide a triangle 2 units to the right.
- Rotation:** Imagine spinning a shape around a certain point.
 - Like spinning a square 90° around its center.
- Reflection:** Picture flipping a shape over a line to see its mirror image.
 - For example, flip a rectangle over the y -axis.
- Dilation:** Visualize making a shape bigger or smaller while keeping its form.
 - Like enlarging a circle 2 times its size.

Practice Problems:

- A point is at $(3, 4)$. Translate it 2 units up and 1 unit to the left. What are the new coordinates?

Answer: _____

- You have a point at $(5, 2)$. If it's rotated 90° clockwise about the origin $(0, 0)$, what are the new coordinates?

Answer: _____

- Describe how a reflection over the y -axis would change the coordinates of a point (a, b) .

Answer: _____



Challenge: A shape is dilated by a scale factor of 3 from the origin. If a point on the shape was originally at $(2, 3)$, where is it after the dilation?
