

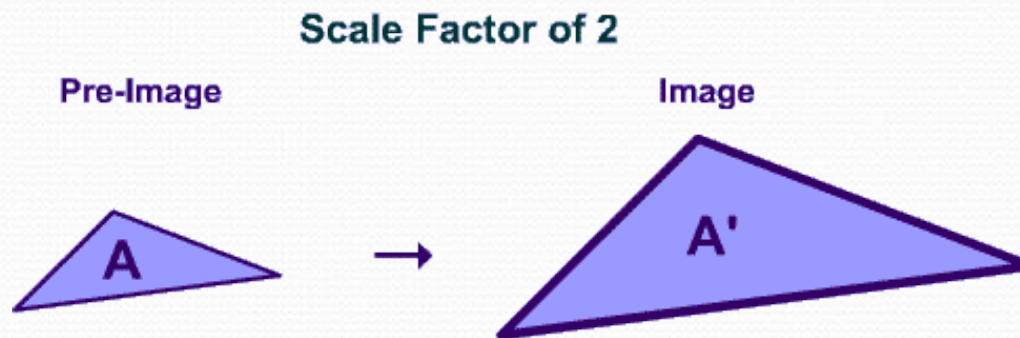
Dilations on a Coordinate Plane

Definition

- Dilation changes the size of an object without changing the shape.

Examples of dilation:

- Your eyes
- Enlarging or reducing a picture



Dilation Rule

- To dilate a figure with respect to the origin, multiply the coordinates of each of its points by the percent of dilation. $(2x, 2y)$

Steps

1. Find the proper multiplier. Hint: change percent to a decimal
 - A 150% dilation would be a 1.5 multiplier.
2. Find the coordinates of each vertex by multiplying the original coordinates by the multiplier.

Example

Quadrilateral ABCD has vertices A(-2,0), B(-2,4), C(2,6), and D(6,-2). Find the new coordinate of 150% dilation.

1. Multiplier: Change 150% to decimal 1.5
2. Multiply all coordinate by 1.5

$$A: -2 \times 1.5 = -3 \quad 0 \times 1.5 = 0 \quad A'(-3,0)$$

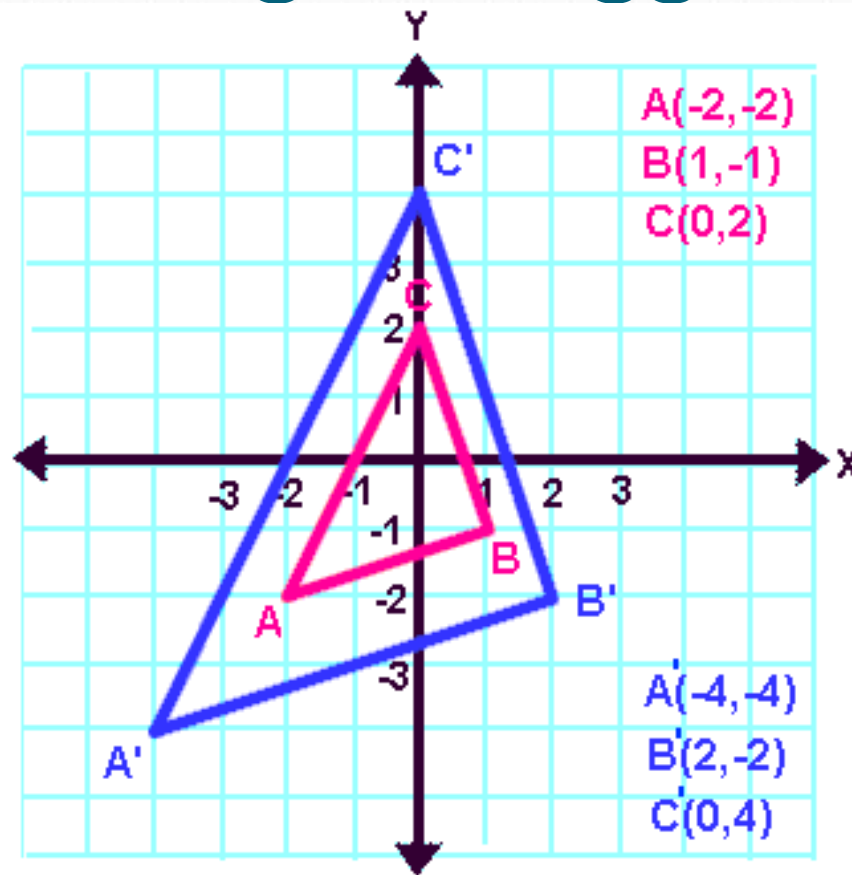
$$B: -2 \times 1.5 = -3 \quad 4 \times 1.5 = 6 \quad B'(-3,6)$$

$$C: 2 \times 1.5 = 3 \quad 6 \times 1.5 = 9 \quad C'(3,9)$$

$$D: 6 \times 1.5 = 9 \quad -2 \times 1.5 = -3 \quad D'(9,-3)$$

Example: Making the figure bigger.

- **PROBLEM:** Draw the dilation image of triangle ABC with the center of dilation at the origin and a scale factor of 2.
- **OBSERVE:** Notice how EVERY coordinate of the original triangle has been multiplied by the scale factor ($\times 2$).
- **HINT:** Dilations involve multiplication!

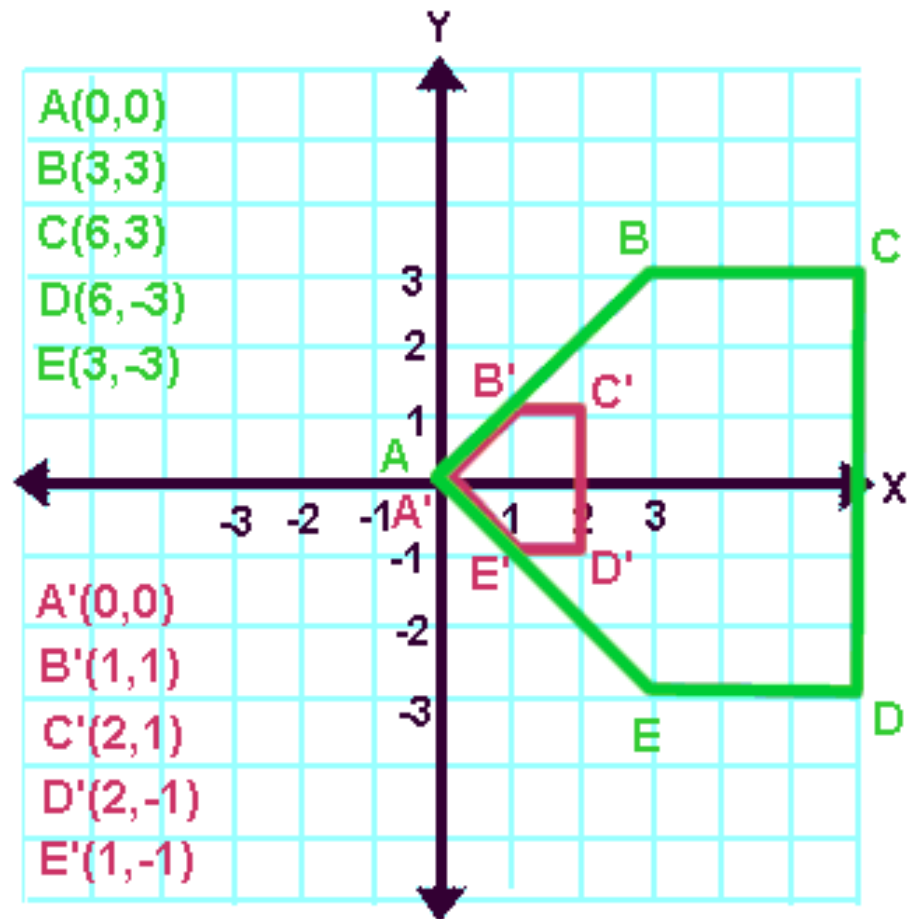


Example: Making the figure smaller.

PROBLEM: Draw the dilation image of pentagon $ABCDE$ with the center of dilation at the origin and a scale factor of $1/3$.

OBSERVE: Notice how **EVERY** coordinate of the original pentagon has been multiplied by the scale factor ($1/3$).

HINT: Multiplying by $1/3$ is the same as dividing by 3!



Practice

1. Draw $\triangle ABC$ after a dilation of 3.

$A(1,3)$ $B(4,3)$ $C(4,1)$

2. Draw $\triangle DEF$ after a dilation of $\frac{1}{2}$

$D(2,2)$ $E(2,6)$ $F(6,4)$

