

7.3 Dilations

Standard:

G.CO.2



Old Transformations — Memorize

1. Translation

"slide"

$$(x, y) \rightarrow (x \pm h, y \pm k)$$

left or right up or down

2. Reflection

"flip"

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

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

3. Rotation

"turn"

$$(x, y) \rightarrow (-y, x) \text{ } 90^\circ \text{ Rotation}$$

$$(x, y) \rightarrow (-x, -y) \text{ } 180^\circ \text{ Rotation}$$

$$(x, y) \rightarrow (y, -x) \text{ } 270^\circ \text{ Rotation}$$

new Dilations

• Dilation is a non-isometric transformation that produces an image that is the same shape as the preimage but different in size.

• A dilation stretches or shrinks the preimage by the scale factor.

Notation

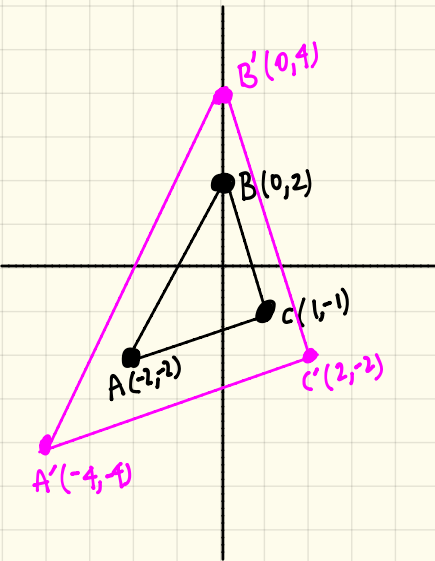
preimage \rightsquigarrow
 (x, y) \longrightarrow

image
 (kx, ky)

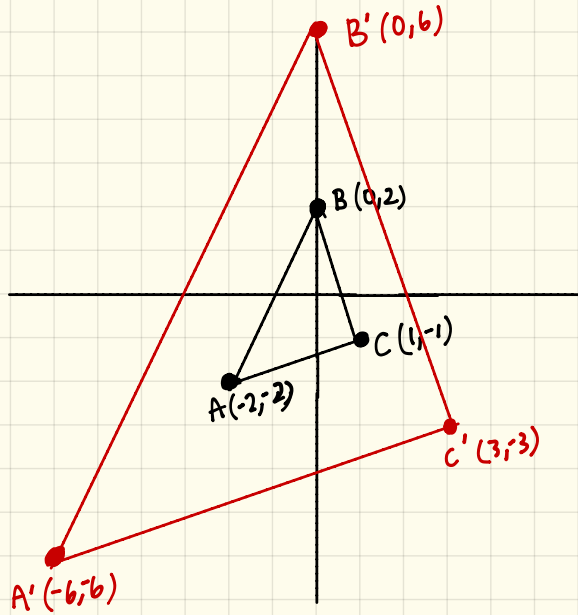
note The "k's" are the scale factors (numbers multiplying x & y)

[Examples]

① $(x, y) \rightarrow (2x, 2y)$



② $(x, y) \rightarrow (3x, 3y)$

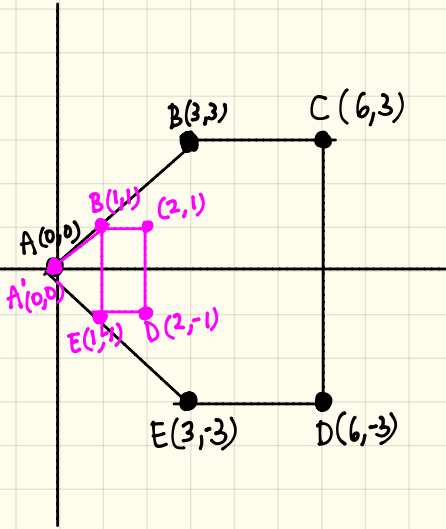


Conclusion

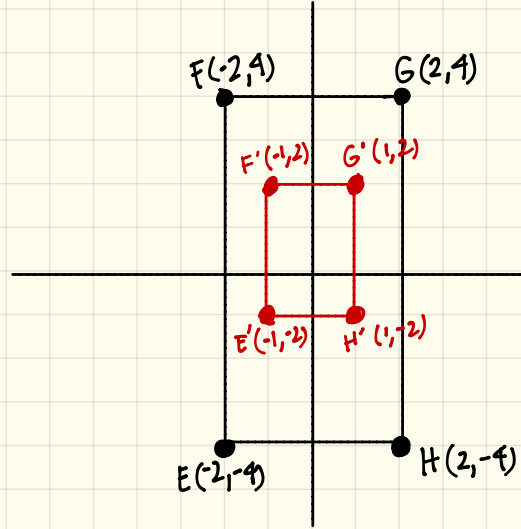
When " k " is greater than 1, then the image will stretch (expand) or get bigger.

[Examples]

① $(x, y) \rightarrow (\frac{1}{3}x, \frac{1}{3}y)$



② $(x, y) \rightarrow (\frac{1}{2}x, \frac{1}{2}y)$



Conclusion when "k" is between 0 and 1, the image will shrink or get smaller.