8.6 Introduction to Similarity

Standards:

G.SRT.1

G.SRT.1a

G.SRT.1b

G.SRT.2

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$\boxed{\text{Old}}$ Isometric Transformations

1. Translation

"Slide"

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

h: left or right
k: up or down

2. Reflection

"flip"

$(x,y) \rightarrow (x,-y)$ across x-axis

$(x,y) \rightarrow (-x,y)$ across y-axis

3. Rotation

"turn"

$(x,y) \rightarrow (-y,x)$ $90°$ Rotation

$(x,y) \rightarrow (-x,-y)$ $180°$ Rotation

$(x,y) \rightarrow (y,-x)$ $270°$ Rotation

- Preimage to the image is the same shape & same size.

Isometric transformations (rigid motion) is where the distances between the points are preserved. Basically, the image is congruent to its preimage.

$\boxed{\text{new}}$ 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.

$\boxed{\text{notation}}$

preimage $\rightsquigarrow$ image

$(x,y) \longrightarrow (kx, ky)$

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

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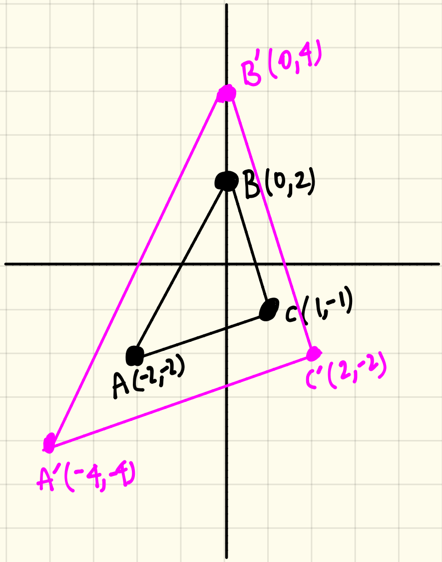
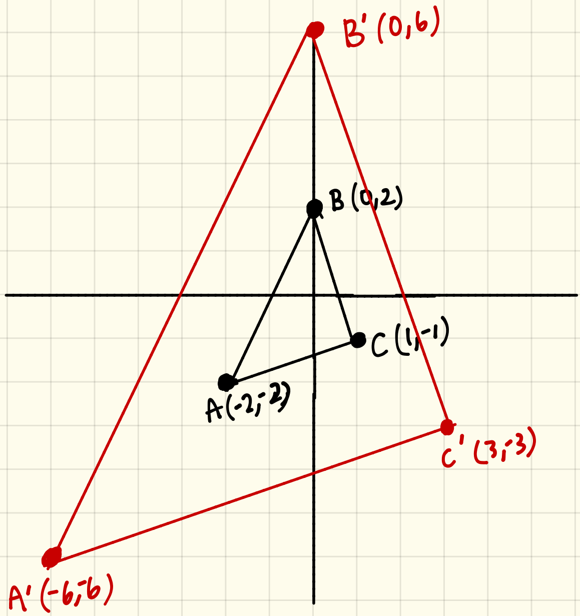
[Examples]

① $(x,y) \to (2x, 2y)$



② $(x,y) \to (3x, 3y)$



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

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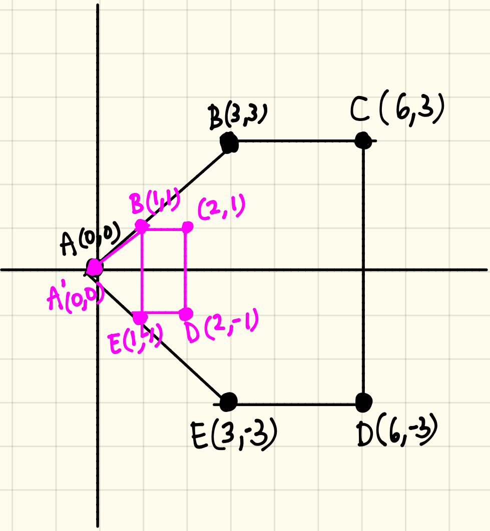
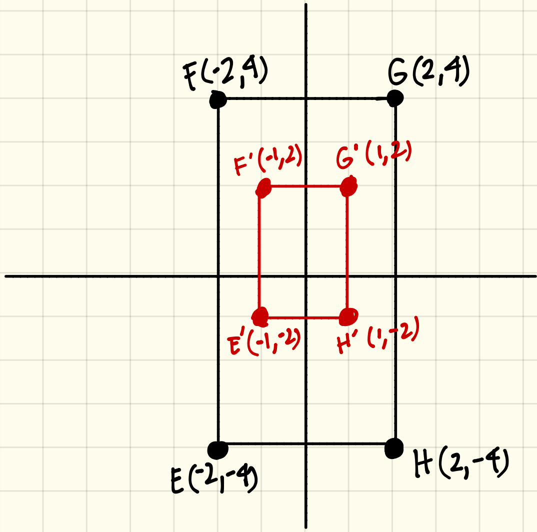
[Examples]

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



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



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

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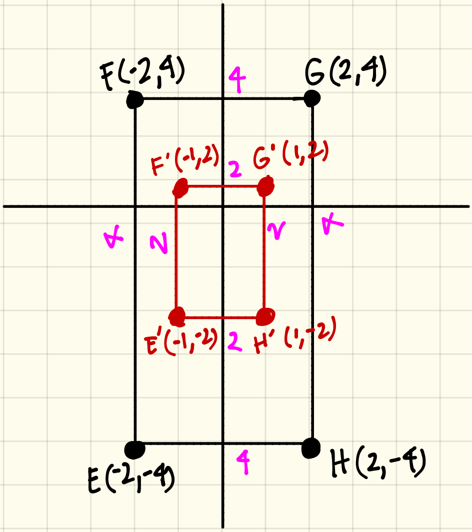
Let's consider the previous example. Is there a relationship between each preimage & image?



$$\frac{\text{Sides of Preimage}}{\text{Sides of Image}} = \frac{FE}{F'E'} = \frac{FG}{F'G'} = \frac{GH}{G'H'} = \frac{EH}{E'H'}$$

$$= \frac{2}{4} = \frac{2}{4} = \frac{2}{4} = \frac{2}{4}$$

$$= \frac{1}{2} = \frac{1}{2} = \frac{1}{2} = \frac{1}{2}$$

Conclusion:

There is a proportional (or ratio) relationship with similar figures.