7.0 Dilations

How would you describe the transformation from the model biplane to the life size biplane?

Learning Targets:

a. I can sketch a dilation.

b. I can apply ordered pair rules to dilations.

DILATION: A transformation that produces an image which is the exact same shape as the pre-image, but not the same size. Dilations are centered on the origin (0, 0), unless noted otherwise.

SCALE FACTOR: A ratio of the form: $r = \frac{image\ length}{pre-image\ length}$

In general, the transformation rule for a dilation is (x, y) → (rx , ry) where *r* represents the scale factor of the polygon.

Examples:

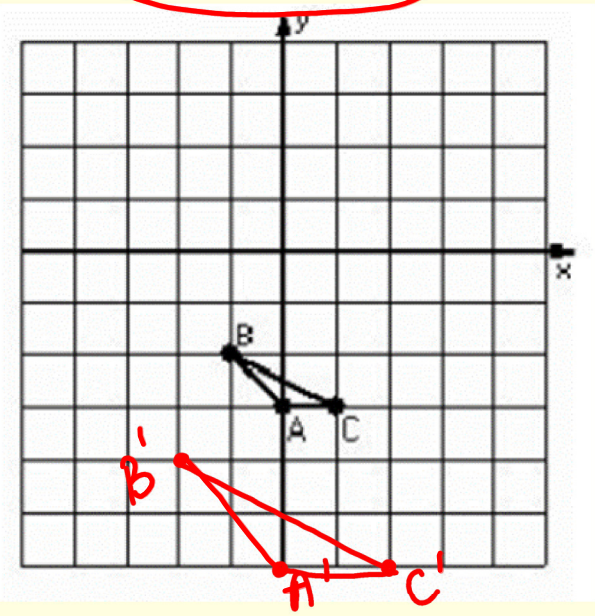
1. Graph the image of the triangle below using a scale factor of 2.

Transformation Rule: (x, y) → (2x, 2y)

A (0, -3) → A' (0, -6)

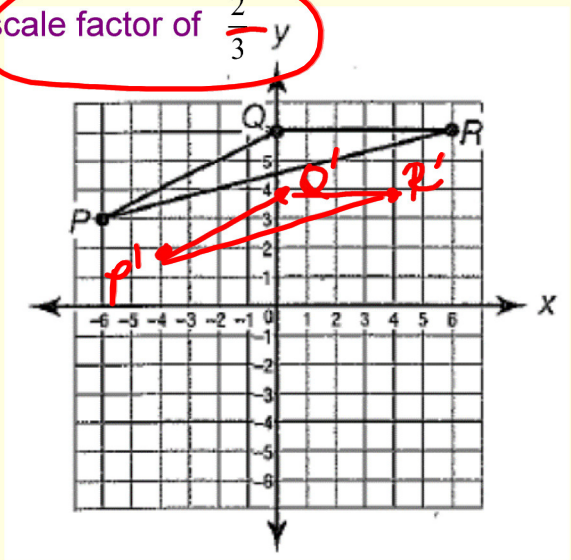
B (-1, -2) → B' (-2, -4)

C (1, -3) → C' (2, -6)



Examples:

2. Graph the image of the triangle below using a scale factor of $\frac{2}{3}$



Transformation Rule: $(x, y) \rightarrow (\frac{2}{3}x, \frac{2}{3}y)$

P (-6, 3) → P' (-4, 2)

Q (0, 6) → Q' (0, 4)

R (6, 6) → R' (4, 4)

Examples:

3. If the scale factor is greater than 1, the figure becomes Enlargement.

If the scale factor is between 0 and 1, the figure becomes Reduction.

Examples:

4. Triangle *ABC* has vertices *A* (0, 2), *B* (4, 4), and *C* (-1, 4).

a) Write the transformation rule for the image with a scale factor of 4?

$(x, y) \rightarrow (4x, 4y)$

b) What are the vertices of its *image* with a scale factor of 4?

$A'(0, 8)$ $B'(16, 16)$ $C'(-4, 16)$

c) Write the transformation rule for the image with a scale factor of $\frac{1}{2}$

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

d) What are the vertices of its image with a scale factor of $\frac{1}{2}$?

$A'(0, 1)$ $B'(2, 2)$ $C'(-\frac{1}{2}, 2)$

Examples:

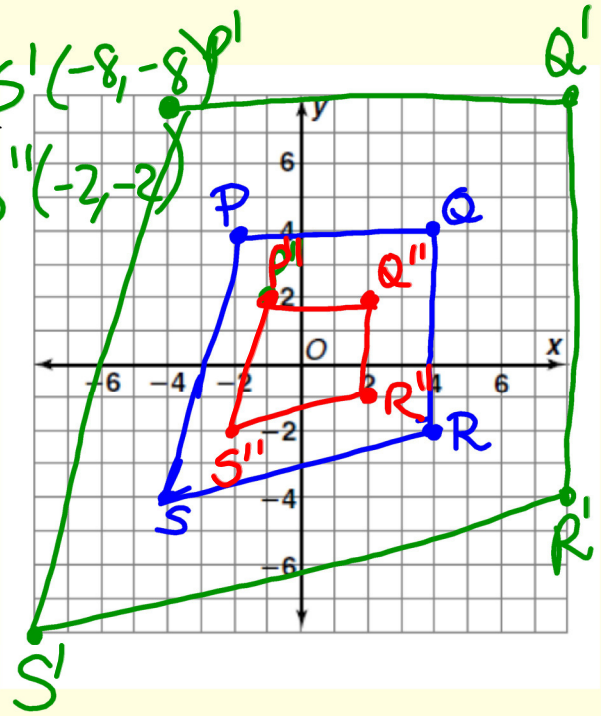
5. Graph quadrilateral *PQRS* has vertices *P* (-2, 4), *Q* (4, 4), *R* (4, -2), and *S* (- 4, - 4).

a) Graph the image P'Q'R'S' if it has a scale factor of 2.

P'(-4,8) Q'(8,8) R'(8,-4) S'(-8,-8)

b) Graph the image P"Q"R"S" if it has a scale factor of $\frac{1}{2}$

P"(-1,2) Q"(2,2) R"(2,-1) S"(-2,-2)



HW Due Friday

Homework: 7.0 Dilations Practice WS