

**Good morning!**

- Park your phones
- Take out HW & stamp sheets

**Challenge:** Given triangle ABC  $A(1,2)$ ,  $B(5,3)$ ,  $C(4,6)$

Complete the following transformations (write the end coordinates)

- 1) Reflect x-axis  $A'(1, -2)$   $B'(5, -3)$   $C'(4, -6)$
- 2) Rotate 90 degrees CCW  $A''(2, 1)$   $B''(3, 5)$   $C''(6, 4)$
- 3) Slide left 5  $A'''(-3, 1)$   $B'''(-2, 5)$   $C'''(1, 4)$
- 4) Slide down 7  $A''''(-3, -6)$   $B''''(-2, -2)$   $C''''(1, -3)$
- 5) Reflect y-axis  $A'''''(3, -6)$   $B'''''(2, -2)$   $C'''''(-1, -3)$

Dilations Notes

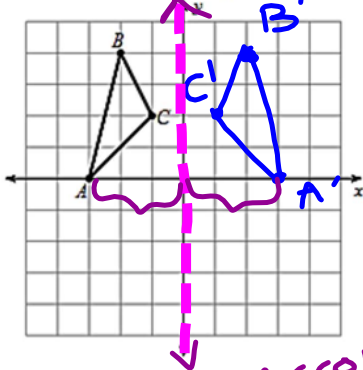
Name: \_\_\_\_\_

Date: 9/27/17

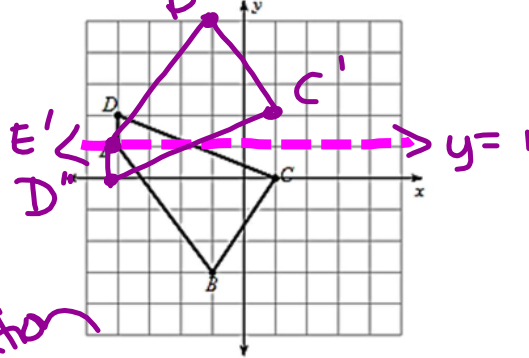
**WARM UP**

Find the coordinates of the vertices of each figure after the given transformation.

1) reflection across the y-axis



2) reflection across  $y = 1$



3) translation:  $(x, y) \rightarrow (x, y - 2)$   
 $K(0, 1), L(0, 3), M(3, 4), N(5, 0)$

$K'(0, -1) L'(0, 1) M'(3, 2)$   
 $N'(5, -2)$

4) translation:  $(x, y) \rightarrow (x + 2, y)$   
 $H(-5, -3), I(-5, 0), J(-2, -2)$

$H'(-3, -3) I'(-3, 0)$   
 $J'(0, -2)$

**Dilations in the Coordinate Plane**

**Dilation** - transformation that produces an image that is the same shape as the original but different size

- A dilation is similar to the original figure. NOT congruent  $\cong$
- Dilations are centered around the origin  $(0, 0)$ , unless otherwise stated.

"K"  
 Scale factor - is  $\frac{\text{image length}}{\text{pre-image length}}$ , which is a ratio (fraction)

- If the scale factor is greater than 1, the figure becomes larger.
- If the scale factor is between 0 and 1, the figure becomes smaller  
 decimals / fractions

Rule:  $(x, y) \rightarrow (cx, cy)$  where  $c$  represents the scale factor.

Arrow Notation  
 $(x, y) \rightarrow (kx, ky)$   
 $k(x, y)$

A type of transformation that preserves the size & shape:

Isometry

Dilations Notes Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Example 1:** If the scale factor is 3, how would you write the rule?

$$(x, y) \rightarrow (3x, 3y)$$

**Example 2:**

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

What are the vertices of its <sup>end</sup> image with a scale factor of 4?

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

Enlargement

**Example 3:**

Quadrilateral PQRS has vertices P (-2, 4), Q (4, 4), R (4, -2), and S (-4, -4). It is dilated by a scale factor of  $\frac{1}{2}$ .

a) What are the coordinates of the image? Graph them.

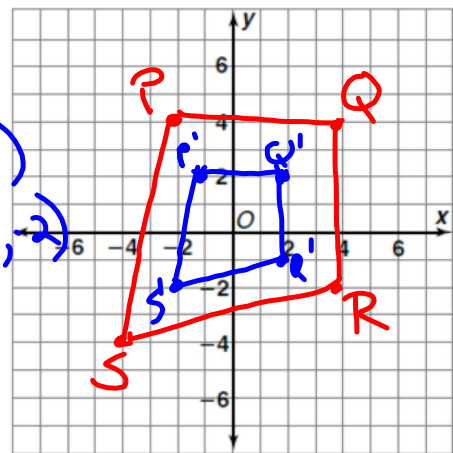
$$P'(-1, 2) \quad Q'(2, 2) \quad R'(2, -1)$$

b) Demonstrate these quadrilaterals are similar by comparing the ratios of the lengths.

$$\frac{\overline{PQ}}{\overline{P'Q'}} = 3 \quad \frac{3}{6} = \boxed{\frac{1}{2}}$$

c) What do you notice about the angle measurements of the two figures?

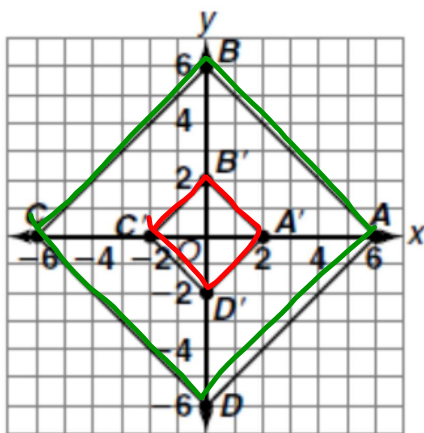
Same angle measure



Similar Quad.  $\sim$

**Example 4:**

Quadrilateral A'B'C'D' is a dilation of quadrilateral ABCD. Find the scale factor. Classify the dilation as an enlargement or a reduction.



reduction

$$B'(0, 2) \quad B(0, 6)$$

$$\frac{2}{6} = \boxed{\frac{1}{3}} \text{ Scale factor}$$

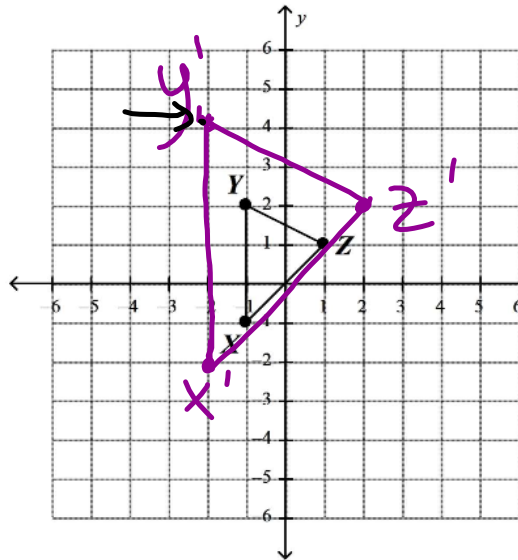
preimage

Dilations Notes

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Example 5**

Triangle XYZ is graphed below. Draw and label Triangle X'Y'Z' after a dilation using a scale factor of two.



2

X (-1, -1)  
 Y (-1, 2)  
 Z (1, 1)

X' (-2, -2)  
 Y' (-2, 4)  
 Z' (2, 2)

What will be the coordinates of point Y'' after a reflection of polygon X'Y'Z' over the x-axis?

Answer (-2, -4)

Geometry CP  
6.7 Dilations Worksheet

Name \_\_\_\_\_

State whether a dilation with the given scale factor is a reduction or an enlargement.

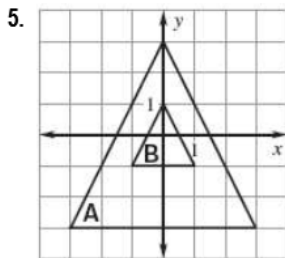
1.  $k = 3$

2.  $k = \frac{1}{3}$

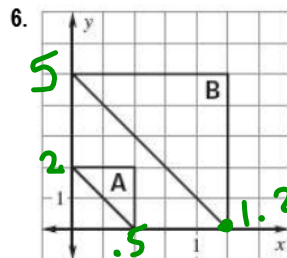
3.  $k = \frac{5}{4}$

4.  $k = 0.93$

Determine whether the dilation from Figure A to Figure B is a reduction or an enlargement. Then find its scale factor.

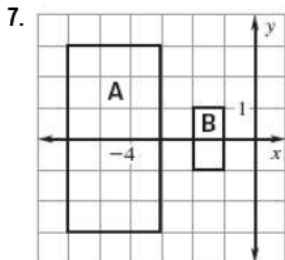


\_\_\_\_\_  $k =$  \_\_\_\_\_

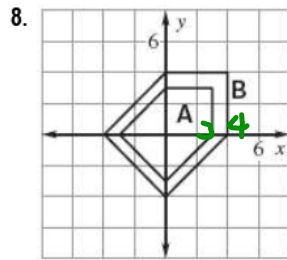


\_\_\_\_\_  $k =$  \_\_\_\_\_

Handwritten notes for problem 6:  $5$ ,  $2$ ,  $.5$ ,  $1.25$ ,  $\frac{1.25}{.5}$ ,  $\frac{5}{2}$



\_\_\_\_\_  $k =$  \_\_\_\_\_



\_\_\_\_\_  $k =$  \_\_\_\_\_

Point A is a vertex of a polygon. Point R is the image of A after the dilation. Find the scale factor of the dilation.

9. A (3, 4) and R (9, 12)

10. A (9, 12) and R (6, 8)

11. A (-2, -3) and R (-10, -15)

A line segment has the given endpoints. Use the scale factor to write the ordered pairs after the dilation.

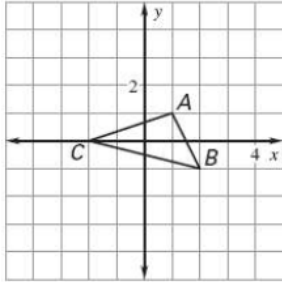
12. A(1, 1), B (3, 1), and  $k = 2$

13. A(4, 4), B(8, 12), and  $k = \frac{3}{4}$

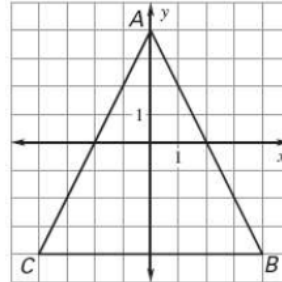
14. A(0, 0), B(-3, 2), and  $k = 5$

Draw a dilation of the figure using the given scale factor.

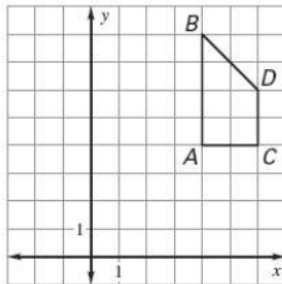
15.  $k = 2$



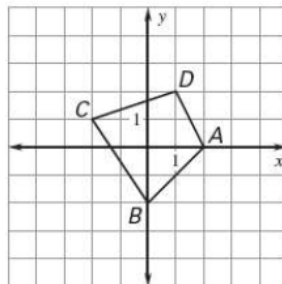
~~16.  $k = \frac{1}{4}$~~



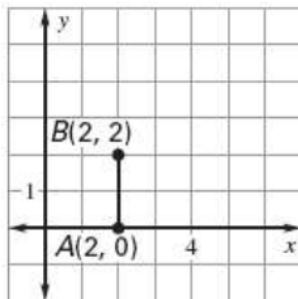
17.  $k = \frac{1}{2}$



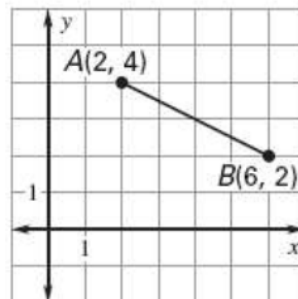
~~18.  $k = 1\frac{1}{2}$~~



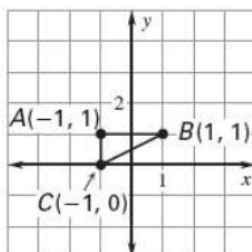
19.  $k = 2$



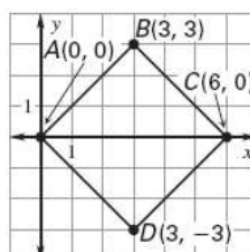
~~20.  $k = \frac{1}{2}$~~



21.  $k = 3$

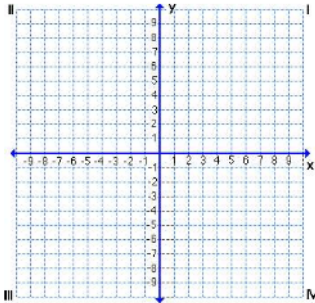


~~22.  $k = \frac{1}{3}$~~

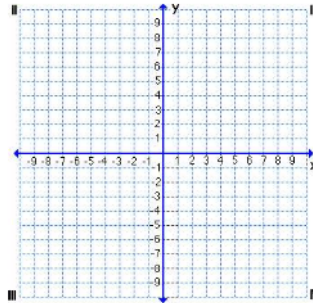


Draw a dilation of the polygon with the given vertices using the given scale factor. Plot the ordered pairs on the coordinate plane AND the dilation.

23. A(-2, 1), B(-4, 1), C(-2, 4); k = 2

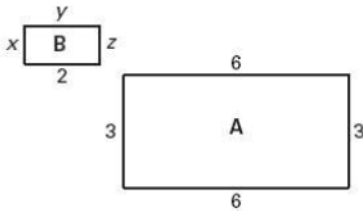


24. A(-5, 5), B(-5, 10), C(10, 0); k = 3/5

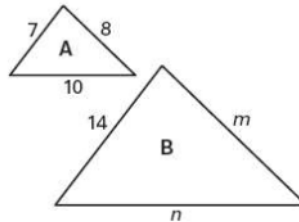


Determine whether the dilation from Figure A to Figure B is a reduction or an enlargement. Then, find the values of the variables.

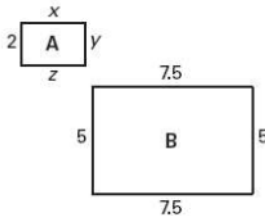
25.



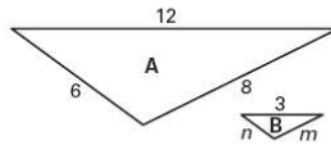
26.



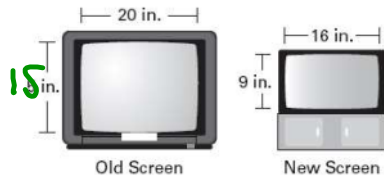
27.



28.



29. The screen on your old television is 20 inches wide and 15 inches high. The screen on your new widescreen television is 16 inches wide and 9 inches high. Is the screen on your new TV a dilation of the screen on your old TV? Explain.



$$\frac{9}{15} = \frac{3}{5} \Rightarrow \text{scale factor}$$

$$\frac{16}{20} = \frac{4}{5}$$

not  $\cong$   
Not a dilation

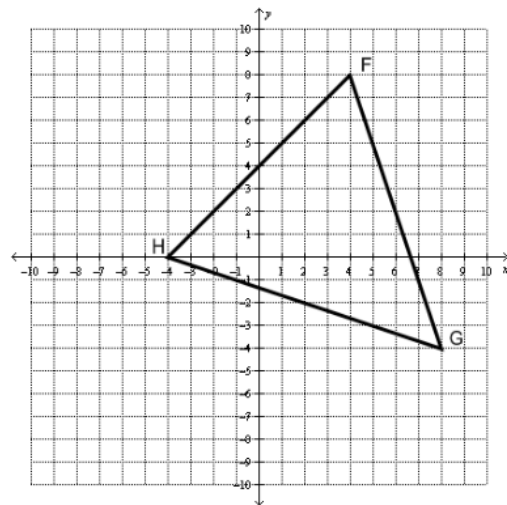
Dilations Practice Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Dilations Practice**

1. Triangle  $PQR$  has coordinates  $P(2,4), Q(-2,4), R(0,-6)$ . Write the coordinates of the vertices of the image of a triangle after a dilation of 1.5.

2. How does the size of an image compare to the original figure when the original figure undergoes a dilation with a scale factor of one?

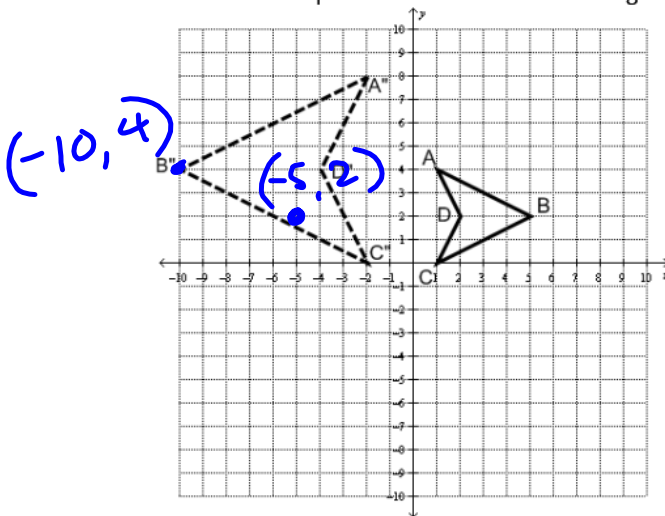
3. On the grid below, draw the image of  $\triangle FGH$  after a dilation with a scale factor of  $\frac{1}{2}$ .



What will be the coordinates of point  $F''$  after a translation of polygon  $F'G'H'$  two units to the left and four units up?

**Answer** \_\_\_\_\_

4. Describe a sequence of transformations to get from polygon  $ABCD$  to polygon  $A''B''C''D''$ .



reflect y-axis  
 $(x, y) \rightarrow (-x, y)$   
 $(x, y) \rightarrow (2x, 2y)$   
 Dilation by 2



