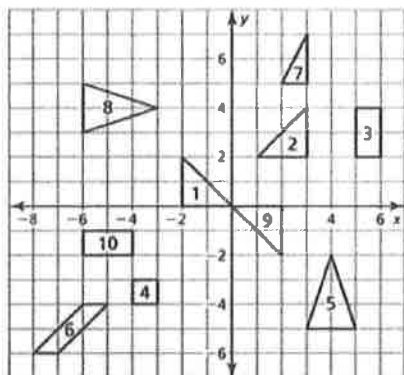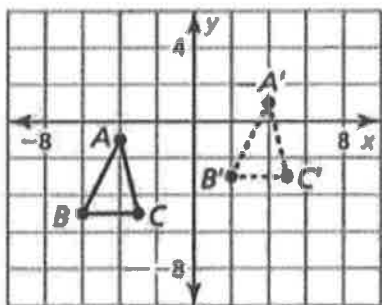Name: _Key_   Date: Hour:

Advanced Geometry
WS PC #2 Unit 4 Review

1. Identify any congruent figures on the coordinate plane. Explain.
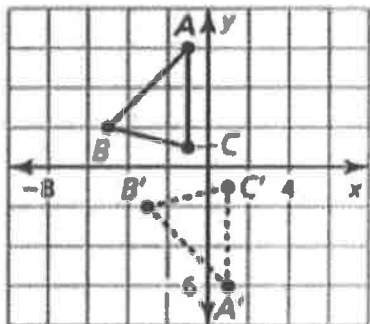

$\triangle$ 1, 2, 9

$\square$ 3, 10

$\triangle$ 5, 8

2. Describe the congruence transformation that maps $\triangle ABC$ to $\triangle A'B'C'$.

translation

$\langle 8, 2 \rangle$

3. Describe the congruence transformation that maps $\triangle ABC$ to $\triangle A'B'C'$.

reflect across x-axis
translate $\langle 2, 0 \rangle$

Determine whether the polygons with the given vertices are congruent. Use transformations to explain your reasoning.

4. $A(5, 2), B(2, 2), C(2, 7)$ and $S(-4, -5), T(-1, -5), U(-1, 0)$

$\triangle ABC \cong \triangle STU$
reflect in y-axis then translate $\langle 1, -7 \rangle$

5. $E(6, -2), F(10, -2), G(10, -8), H(6, -8)$ and $W(4, 8), X(4, 10), Y(8, 10), Z(8, 8)$

not $\cong$, can't use a rigid motion

6. Find the measure of the acute or right angle formed by intersecting lines so that P can be mapped to P'' using two reflections.
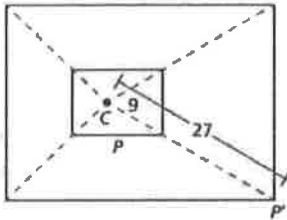   a. A rotation of $28°$ maps P to P''

$$\frac{28}{2} = \boxed{14°}$$

    b. The rotation $(x, y) \rightarrow (-y, x)$ maps P to P''.

$(-y, x)$ is $270°$ counterclockwise
which is same as $90°$ clockwise
so $90/2 = \boxed{45°}$

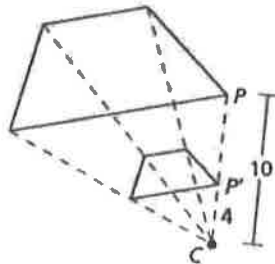Find the scale factor of the dilation. Then tell whether the dilation is a reduction or an enlargement.

7.

$$\frac{27}{9} = 3 \qquad \boxed{k = 3}$$

$$\boxed{enlargement}$$

8.

$$\frac{4}{10} = \frac{2}{5} \qquad \boxed{k = \frac{2}{5}}$$

$$\boxed{reduction}$$

Using the polygons listed below, find the coordinates of the image after a dilation with a scale factor k.

9. $P(1, 2), Q(2, 2), R(4, -2), S(-1, -3); k = 2$

$$P'(2, 4) \quad Q'(4, 4) \quad R'(8, -4) \quad S'(-2, -6)$$

10. $A(-4, 4), B(-2, 6), C(1, -1), D(-2, -4); k = -75\%$

same as $-\frac{3}{4}$

$$A'(3, -3) \quad B'\left(\frac{3}{2}, -\frac{9}{2}\right) \quad C'\left(-\frac{3}{4}, \frac{3}{4}\right) \quad D'\left(\frac{3}{2}, 3\right)$$

11. A standard piece of paper is 8.5 inches by 11 inches. A piece of legal-size paper is 8.5 inches by 14 inches. By what scale factor k would you need to dilate the standard paper so that you could fit two pages on a single piece of legal paper?

$$\frac{11}{14} = \boxed{0.79}$$

Using $\triangle PQR$ with vertices $P(-1, 5), Q(-4, 3), R(-2, 1)$, find the coordinates of its image after the similarity transformation.

12. Rotation: $180°$ about the origin

Dilation: $(x, y) \rightarrow (2x, 2y)$

$(-x, -y)$

$180°$

$(2x, 2y)$

$P(-1, 5) \xrightarrow{\hspace{1cm}} P'(1, -5) \xrightarrow{\hspace{1cm}} P''(2, -10)$

$Q(-4, 3) \xrightarrow{\hspace{1cm}} Q'(4, -3) \xrightarrow{\hspace{1cm}} Q''(8, -6)$

$R(-2, 1) \xrightarrow{\hspace{1cm}} R'(2, -1) \xrightarrow{\hspace{1cm}} R''(4, -2)$

13. Dilation: $(x, y) \rightarrow (\frac{1}{2}x, \frac{1}{2}y)$

Reflection: in the x-axis

$(x, -y)$

ref. x-axis

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

$P(-1, 5) \xrightarrow{\hspace{1cm}} P'(\frac{1}{2}, \frac{5}{2}) \rightarrow P''(\frac{1}{2}, -\frac{5}{2})$

$Q(-4, 3) \rightarrow Q'(-2, \frac{3}{2}) \rightarrow Q''(-2, -\frac{3}{2})$

$R(-2, 1) \rightarrow R'(-1, \frac{1}{2}) \rightarrow R''(-1, -\frac{1}{2})$

14. Describe a similarity transformation that maps the black preimage onto the dashed image.
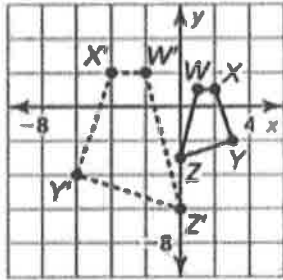
reflect in y-axis $(-x, y)$
then dilate by $k = 2$

Determine whether the polygons with the given vertices are similar. Use transformations to explain your reasoning.

15. $A(-2, 5), B(-2, 2), C(-1, 2)$ and $D(3, 3), E(3, 1), F(2, 1)$

yes, translate $\langle 5, -1 \rangle$ then $(\frac{2}{3}x, \frac{2}{3}y)$

16. $J(-5, -3), K(-3, -1), L(-3, -5), M(-5, -5)$ and $T(3, 3), U(4, 3), V(4, 2), W(3, 1)$

yes, rotate $180°$ $(-x, -y)$ then $(\frac{1}{2}x, \frac{1}{2}y)$