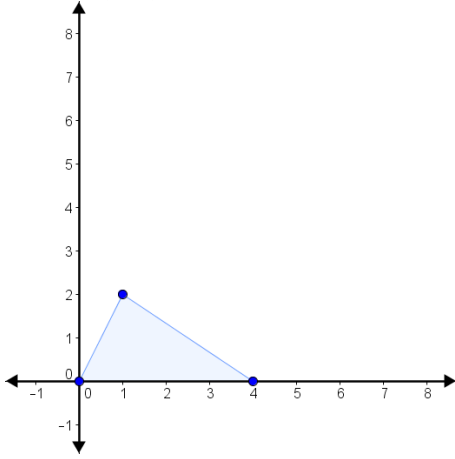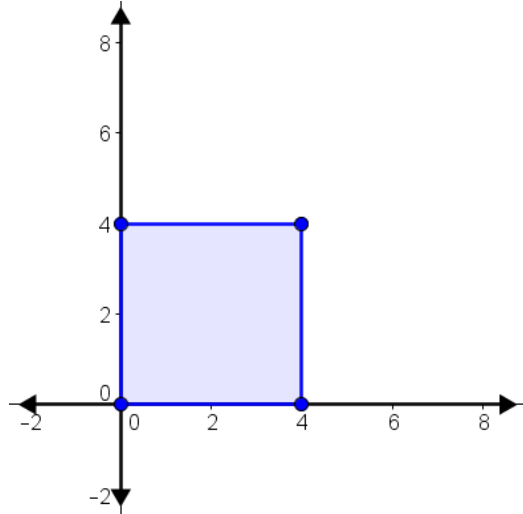# SM2 8.1: Dilations

*Problems:* Draw the dilation image of each figure with the center of dilation at (0,0) and the given and scale factor.
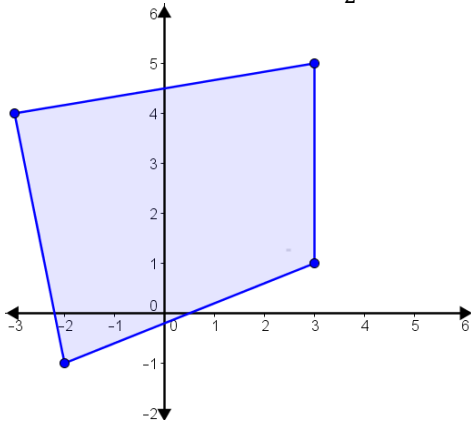
1) Center (0,0); scale factor 2

2) Center (0,0); scale factor 2

3) Center (0,0); scale factor $\frac{1}{2}$

4) Center (0,0); scale factor 2

5) Center (0,0); scale factor $\frac{1}{2}$
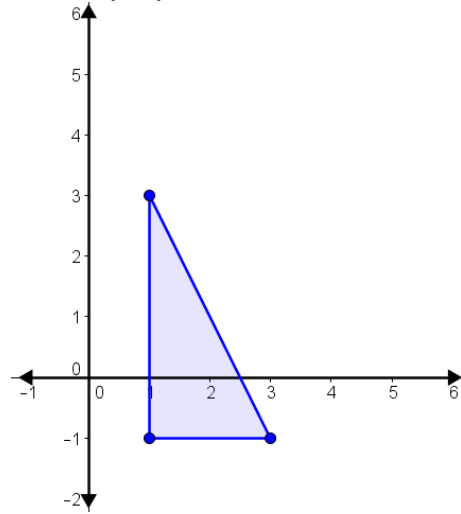
6) Center (0,0); scale factor $\frac{1}{3}$

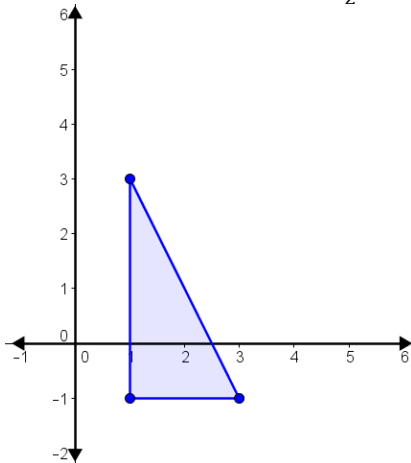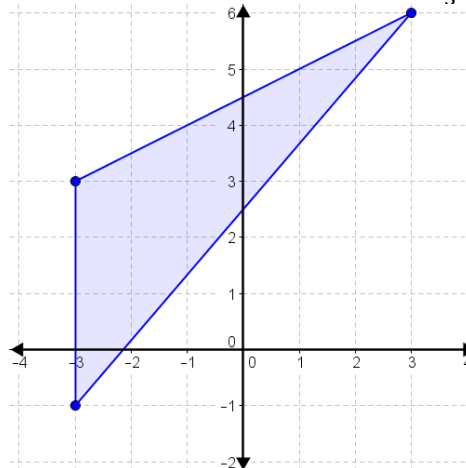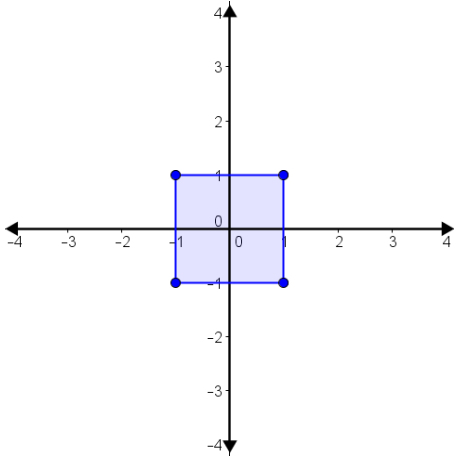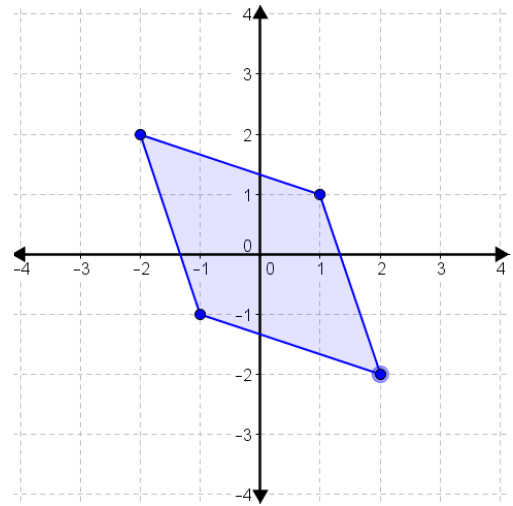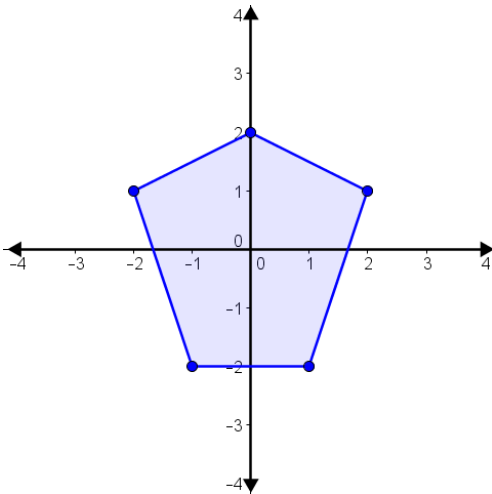7) Center (0,0); scale factor  4

8) Center (0,0); scale factor $\frac{1}{2}$

9) Center (0,0); scale factor 2

10) Center (0,0); scale factor $\frac{1}{2}$
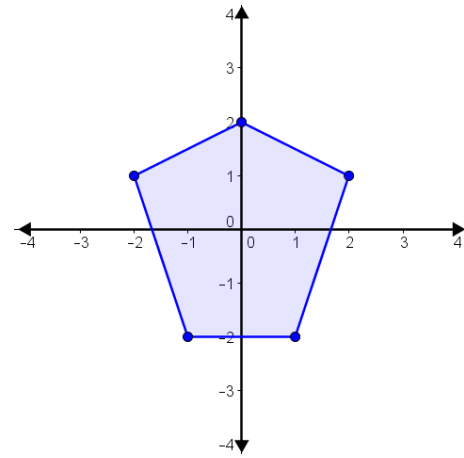
**Determine whether each statement is true or false.**

11) A dilation with a scale factor greater than 1 will shrink the image.

12) For a dilation, corresponding angles of the image and pre-image are congruent.

13) A dilation image cannot have any points in common with its pre-image.
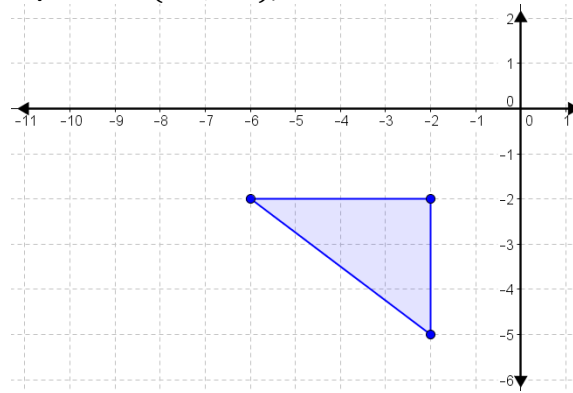
14) A dilation preserves length.

Draw the dilation image of each figure with the given center of dilation at and the scale factor.
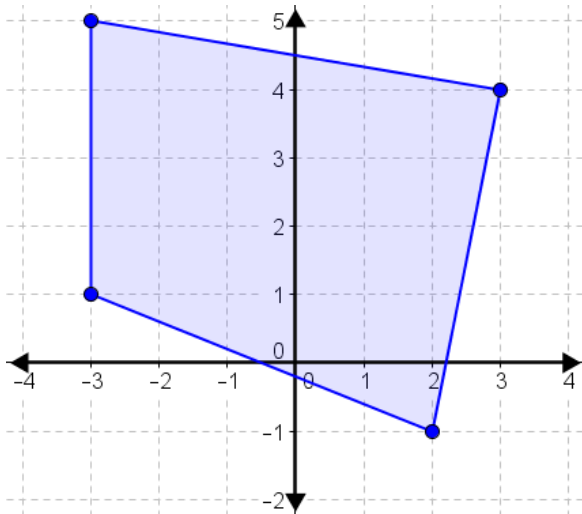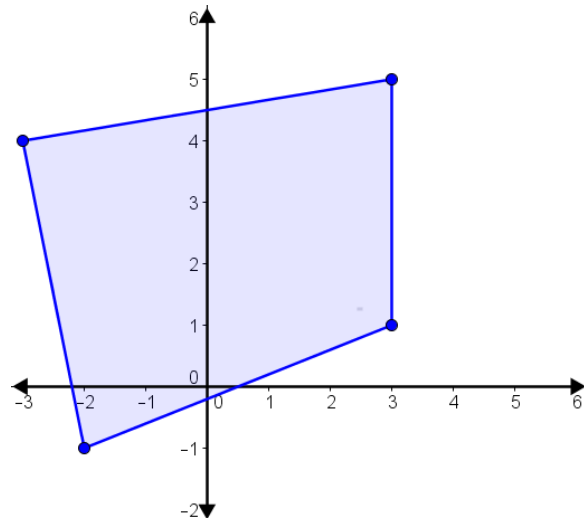
15) Center $(1, -1)$; scale factor 2
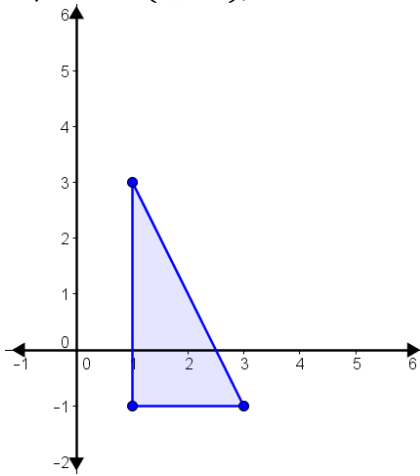
16) Center $(-2, -5)$; scale factor 2
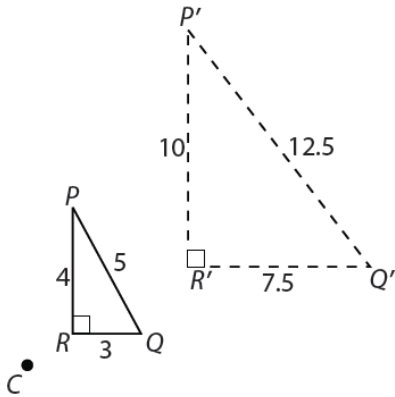
17) Center $(3,4)$; scale factor $\frac{1}{3}$

18) Center $(3,5)$; scale factor $\frac{1}{2}$

The following transformations represent dilations. Determine the scale factor and whether the dilation is an enlargement, a reduction, or a congruency transformation.

19)



20)
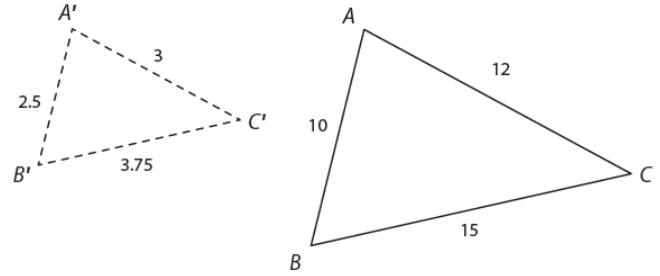


21) Graph the pre-image with given vertices. $J(2,4), K(4,4), and \ P(3,2)$. Then graph the image with center of dilation at the origin and a scale factor of 2.



22) Graph the pre-image with given vertices. $J(2,4), K(4,4), and \ P(3,2)$. Then graph the image with center of dilation at the origin and a scale factor of $\frac{1}{2}$.

**Application Problems:**

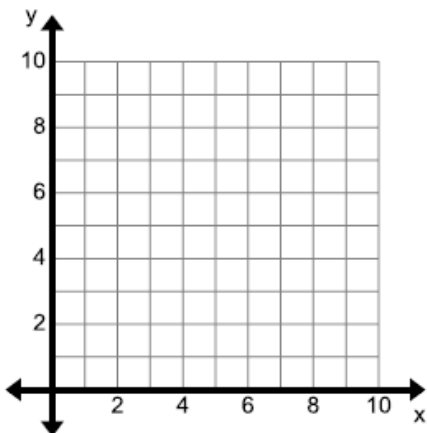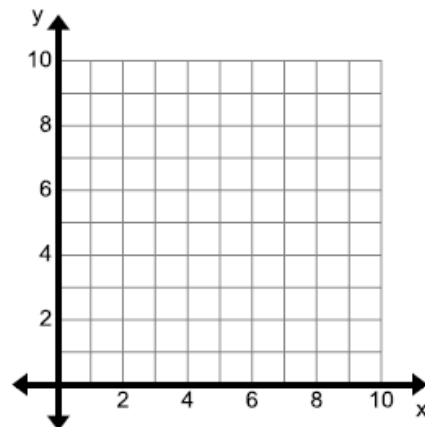23) A university wants to put in a courtyard for a new building. The courtyard is bounded by the coordinates $P(-4,0), Q(-2,-6), R(6,2),$ and $S(0,4)$. The landscape architects created a dilation of the space through the center $C(0,0)$ to outline the garden. The garden is bounded by the points $P'(-2.4,0), Q'(-1.2,-3.6), R'(3.6,1.2),$ and $S'(0,2.4)$. What is the scale factor? Does this represent an enlargement, a reduction, or a congruency transformation? Explain.
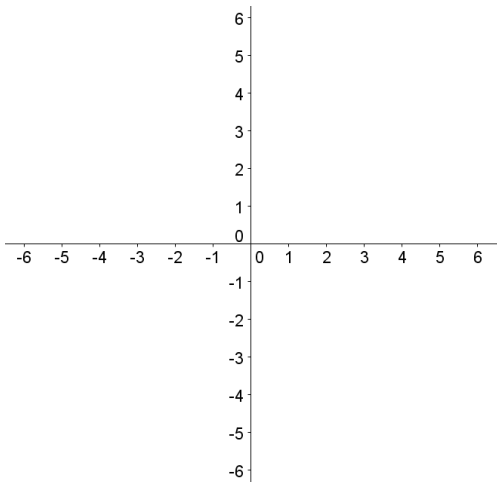
24) A neighborhood committee is planning a new community pool. The committee has proposed a design for the pool. The design consists of two rectangles. The inner rectangle is the pool, and has been dilated about $C(0,0)$ to create the concrete walkway that will border the pool. The vertices of the pool are $P(-2,4), Q(2,4), R(2,-4),$ and $S(-2,-4)$. The vertices of the outside edge of the concrete walkway are $P'(-3,6), Q'(3,6), R'(3,-6),$ and $S'(-3,-6)$. What is the scale factor? Does this represent an enlargement, a reduction, or a congruency transformation? Explain.