

## Indicators

### Objective:

#### 3.03 Identify, predict, and describe dilations in the coordinate plane.

Vocabulary and Resources		
transformation	image	notation:
enlargement	pre-image	$\triangle ABC \rightarrow \triangle DEF$
reduction	similarity	$\triangle ABC \rightarrow \triangle A'B'C'$
shrink	ratio	$A \rightarrow A'$
stretch	proportion	$(x, y) \rightarrow (x', y')$
scaling	corresponding parts	$(x', y') = (ax, ay)$
scale factor	coordinate plane	

**A.** On graph paper, draw one of your initials using block letters. Now create a dilation of this letter using a scale factor of two. How does the area of the dilation compare to the area of the original letter?

**B.** How do the images of dilations with scale factors greater than one compare to their pre-images? How do the images of dilations with scale factors less than one but greater than zero compare to their pre-images?

**C.** Triangle  $ABC$  with coordinates  $A(2, 4)$ ;  $B(2, 2)$ ; and  $C(4, 2)$  is transformed with the new coordinates of triangle  $A'B'C'$  as follows:  $A'(4, 10)$ ;  $B'(4, 4)$ ; and  $C'(10, 4)$ . Is this transformation a dilation? Explain.

**D.** John claims that figure  $A'B'C'D'$  is a dilation with a scale factor of one-half. He made an error when listing the coordinates of the points. Identify the error and make the appropriate correction. Explain your reasoning.

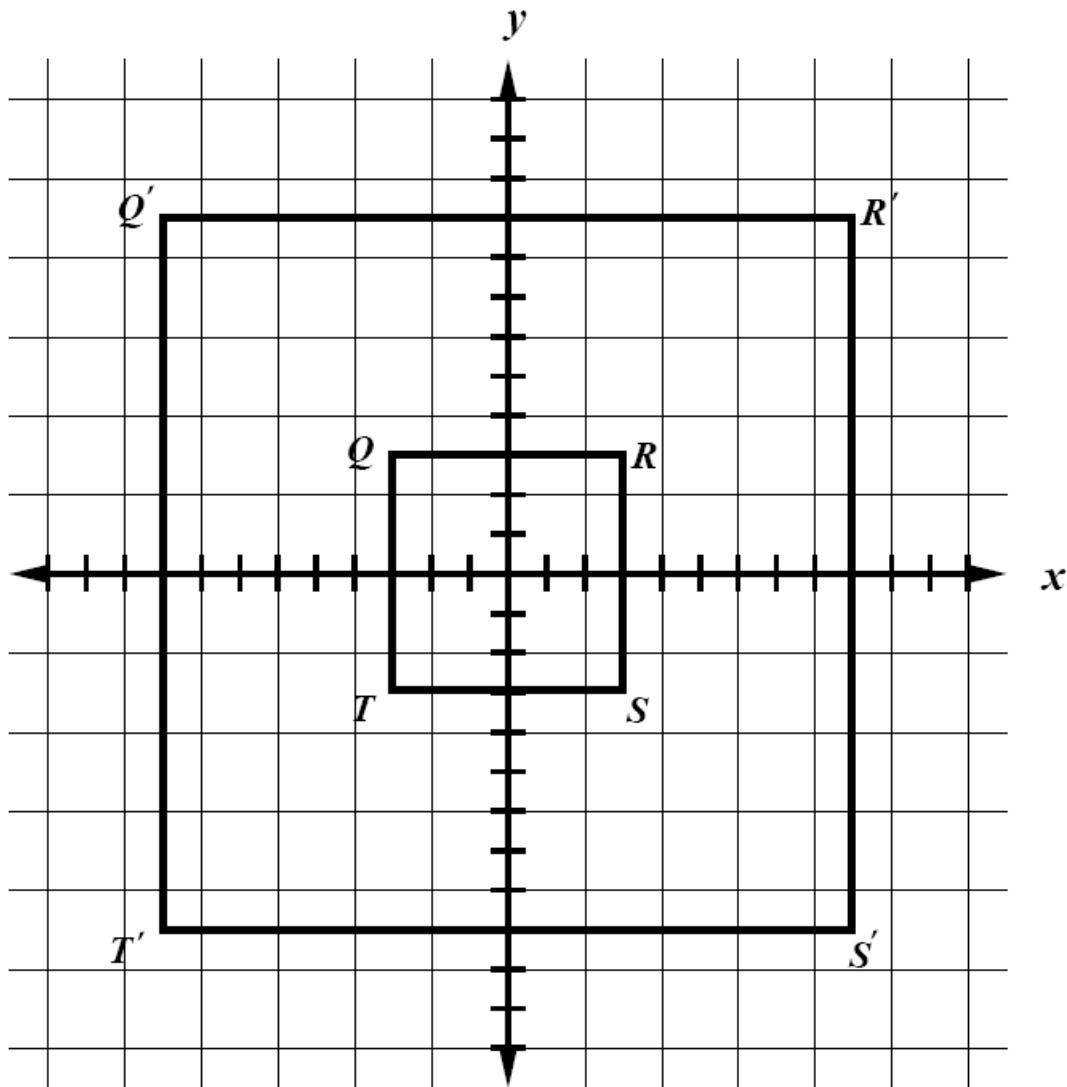
- I.  $A (4, 2)$        $A' (2, 1)$
- II.  $D (-6, -4)$        $D' (-3, -2)$
- III.  $C (3, -8)$        $C' (1, -4)$
- IV.  $B (-6, 1)$        $B' (-3, 0.5)$

**E.** Plot the given points on a coordinate plane. Connect the points in order and connect the last point to the first one.

$(-6, 8), (2, 8), (8, -4), (-6, -4)$

- a. What polygon is formed?
- b. Graph the image of the polygon after a dilation with scale factor of 0.25.
- c. How does the area of the image compare to the area of the original polygon?

**F.** The image of figure  $QRST$  is figure  $Q'R'S'T'$ . What is the scale factor for this dilation?



**G.** Triangle  $KLM$  with coordinates  $K(-3, -2)$ ;  $L(0, 4)$ ; and  $M(4, 2)$  is transformed according to the rule:  $(x', y') = (3x, 3y)$ . Graph the image of triangle  $KLM$  and give the coordinates of its vertices.