

(DN) What defines a similarity transformation?

Name \_\_\_\_\_ Per \_\_\_\_\_

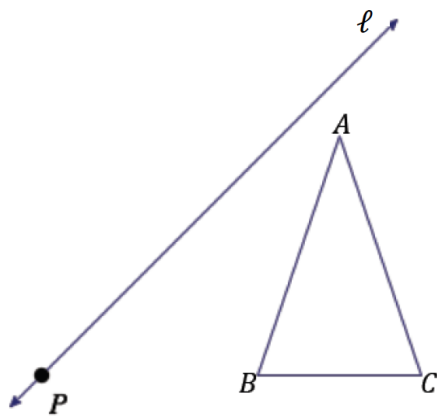
LO: I can construct a similarity transformation.

□ (1) **Similarity: Mapping one figure to another through a composition of transformations.**

compass,  
straightedge

Similarity transformation  $G$  consists of a rotation about the point  $P$  by  $90^\circ$ , followed by a dilation centered at  $P$  with scale factor  $r = 2$ , and then a reflection across line  $l$ . Find the image of the triangle.

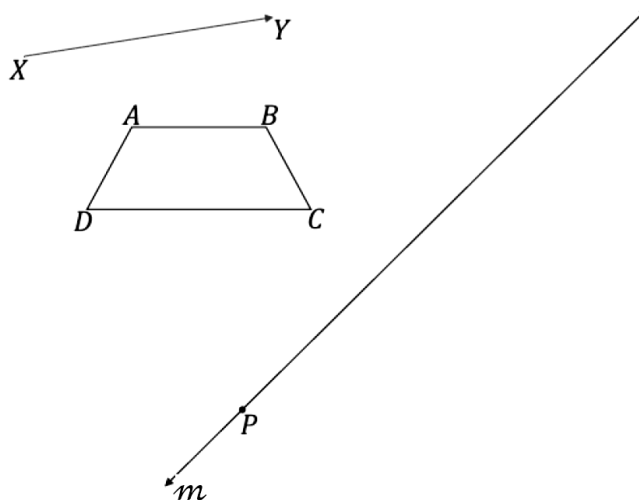
Write the sequence in short notation: \_\_\_\_\_



(2) **Similarity: Mapping one figure to another through a composition of transformations.**

compass,  
straightedge

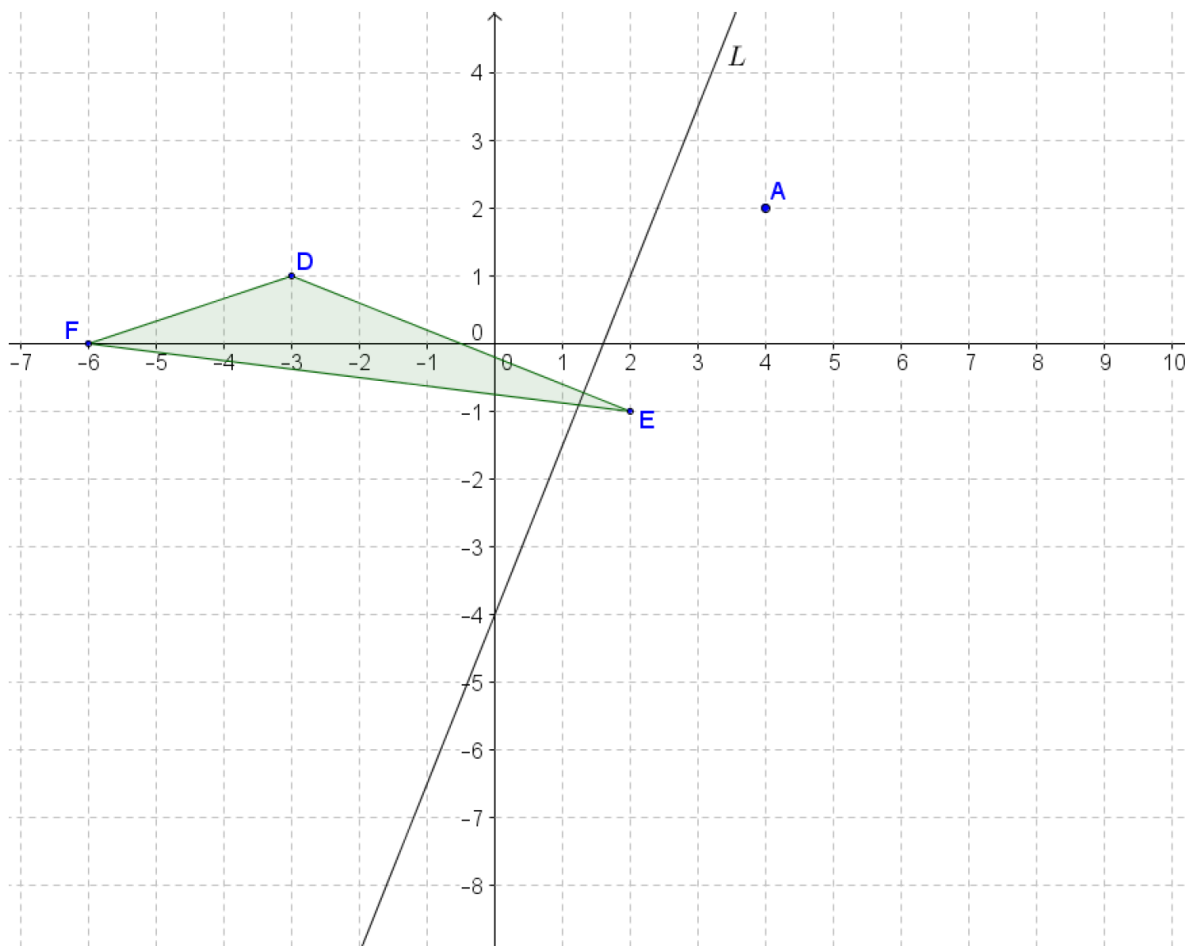
A similarity transformation  $G$  applied to trapezoid  $ABCD$  consists of a translation by vector  $\overrightarrow{XY}$ , followed by a reflection across line  $m$ , and then followed by a dilation centered at  $P$  with scale factor  $r = 2$ . Recall that we can describe the same sequence using the following notation:  $D_{P,2} \left( r_m \left( T_{\overrightarrow{XY}} (ABCD) \right) \right)$ . Find the image of  $ABCD$ .



□ (3)  
compass,  
straightedge

**Similarity: Mapping one figure to another through a composition of transformations.**

A similarity transformation for triangle  $DEF$  is described by  $r_n \left( D_{A, \frac{1}{2}} \left( R_{A, 90^\circ} (\triangle DEF) \right) \right)$ . Locate and label the image of triangle  $DEF$  under this transformation.



(4) **Similarity Transformation Properties: Lesson Summary**

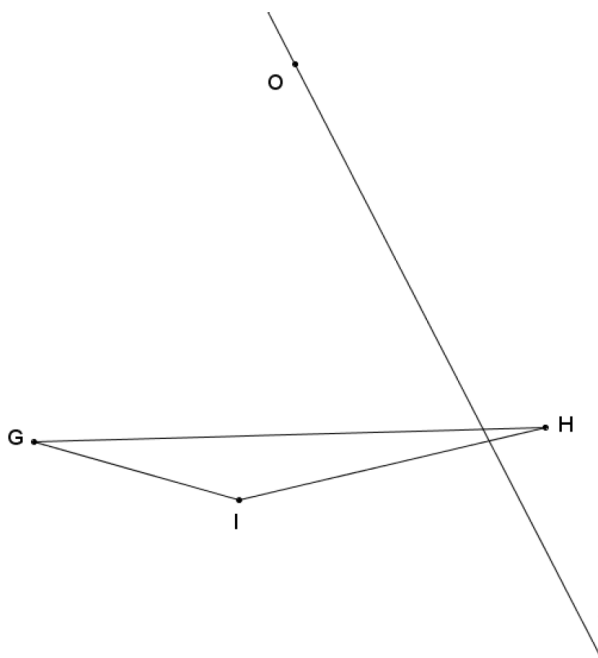
Properties of similarity transformations

- (1) Distinct points are mapped to \_\_\_\_\_
- (2) Each image point  $P'$  in the plane has a \_\_\_\_\_ point  $P$ .
- (3) There is a scale factor,  $r$ , such that  $P'Q' =$  \_\_\_\_\_
- (4) Lines map to \_\_\_\_\_, rays to \_\_\_\_\_, segments to \_\_\_\_\_, parallel lines to \_\_\_\_\_, angles to \_\_\_\_\_ and circles to \_\_\_\_\_.

(5) **Similarity: Mapping one figure to another through a composition of transformations.**

compass,  
straightedge

A similarity transformation consists of a reflection over line  $l$ , followed by a dilation from  $O$  with a scale factor of  $r = \frac{3}{4}$ . Use construction tools to find  $\triangle G''H''I''$ .

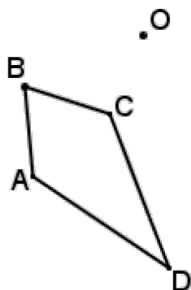


(6) **Exit Ticket**compass,  
straightedge

The Exit Ticket is on the last page of this packet. Do it, tear it off and turn it in.

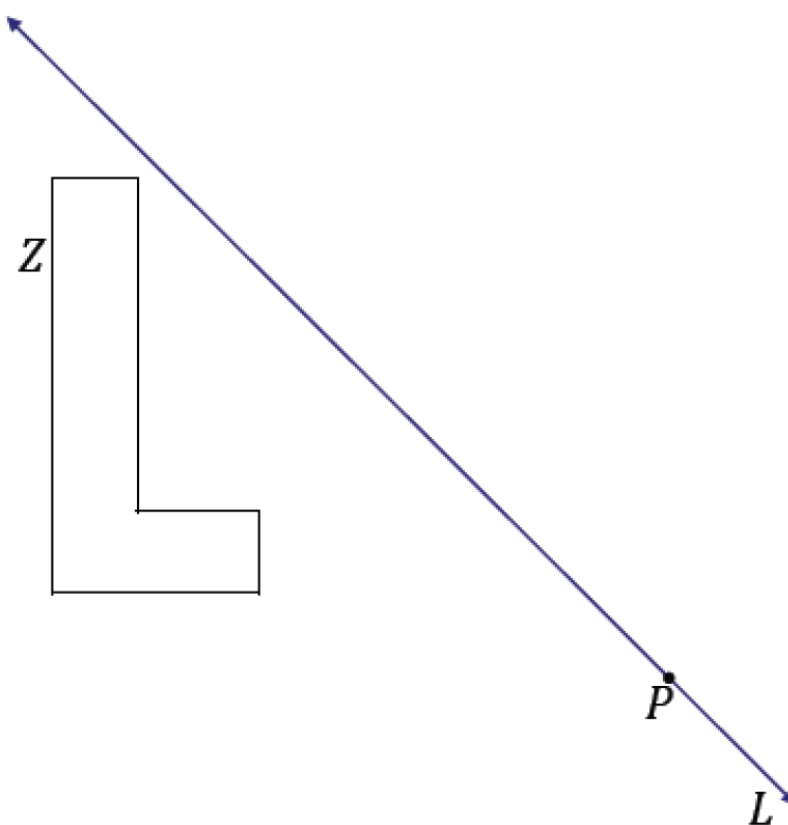
 (7) **Homework: REQUIRED: any 3 problems**compass,  
straightedge

(1) A similarity transformation consists of a dilation from point  $O$  with a scale factor of  $r = 2\frac{1}{2}$ , followed by a rotation about  $O$  of  $-90^\circ$ . Use construction tools to find kite  $A''B''C''D''$ .



(7) Homework  
cont.

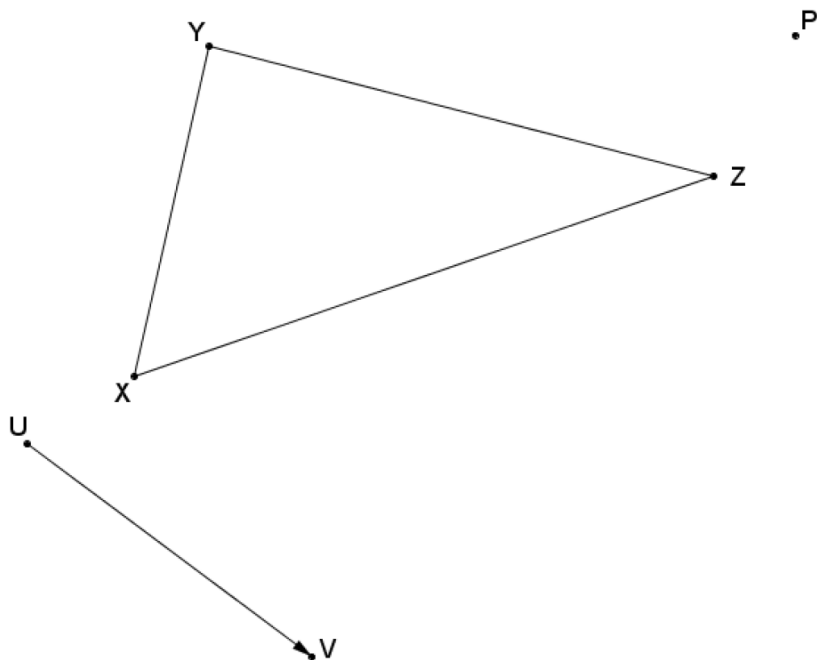
(2) For the figure  $Z$ , find the image of  $r_l \left( R_{P, 90^\circ} \left( D_{P, \frac{1}{2}}(Z) \right) \right)$ .



(7) **Homework**

cont.

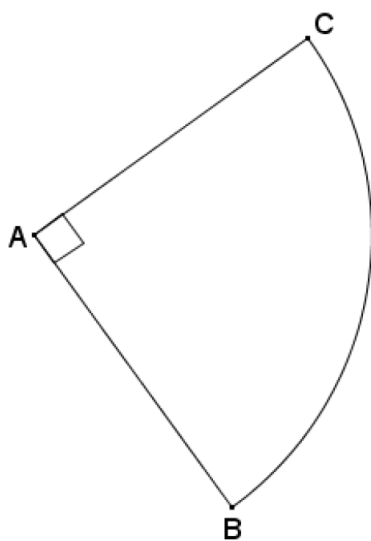
(3) A similarity transformation consists of a translation along vector  $UV$ , followed by a rotation of  $60^\circ$  about  $P$ , then a dilation from  $P$  with scale factor  $r = 1/3$ . Use construction tools to find  $\triangle X''Y''Z''$



(7) **Homework**

cont.

(4) Given the quarter-circular figure determined by points  $A$ ,  $B$ , and  $C$ , a similarity transformation consists of a  $-65^\circ$  rotation about point  $B$ , followed by a dilation from point  $O$  with a scale factor of  $r = \frac{1}{2}$ . Find the image of the figure determined by points  $A''$ ,  $B''$ ,  $C''$ .



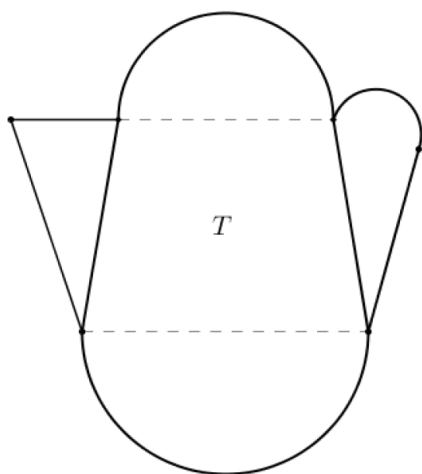
Describe a different similarity transformation that would map quarter-circle  $ABC$  to quarter-circle  $A''B''C''$ .

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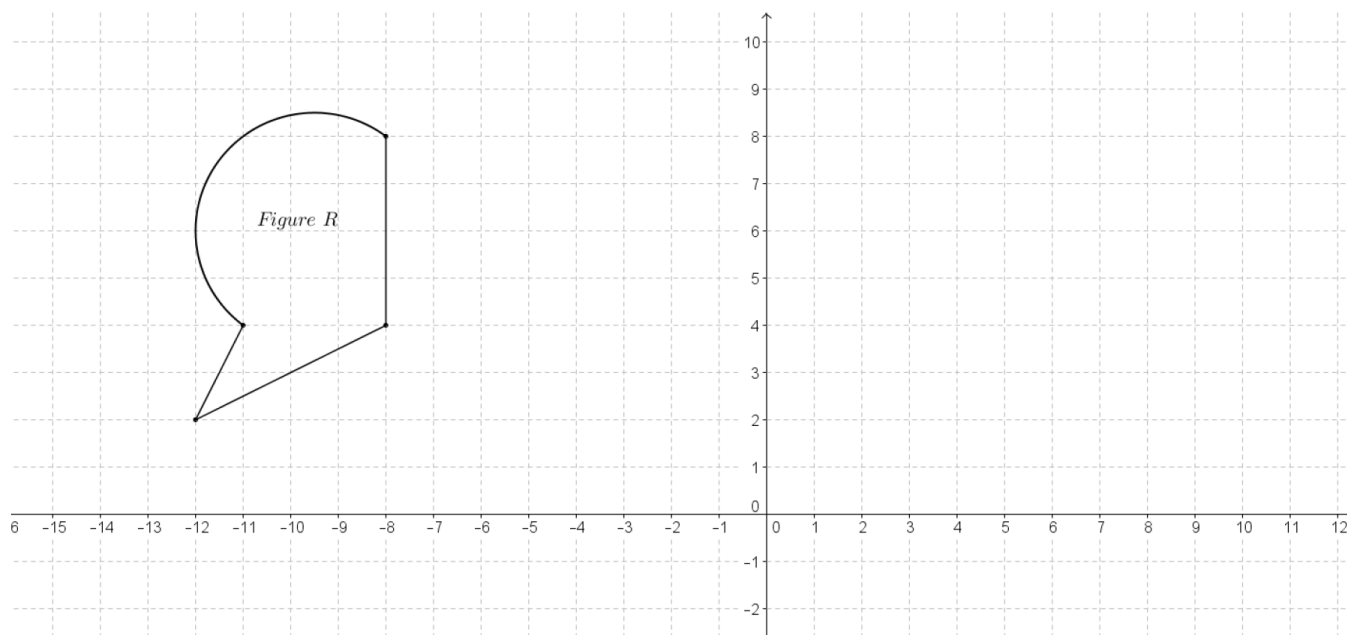


(7) Homework  
cont.

(5) A similarity transformation consists of a dilation from center  $O$  with a scale factor of  $\frac{1}{2}$ , followed by a rotation of  $60^\circ$  about point  $O$ . Complete the similarity transformation on *Figure T* to complete the drawing of *Figure T''*.



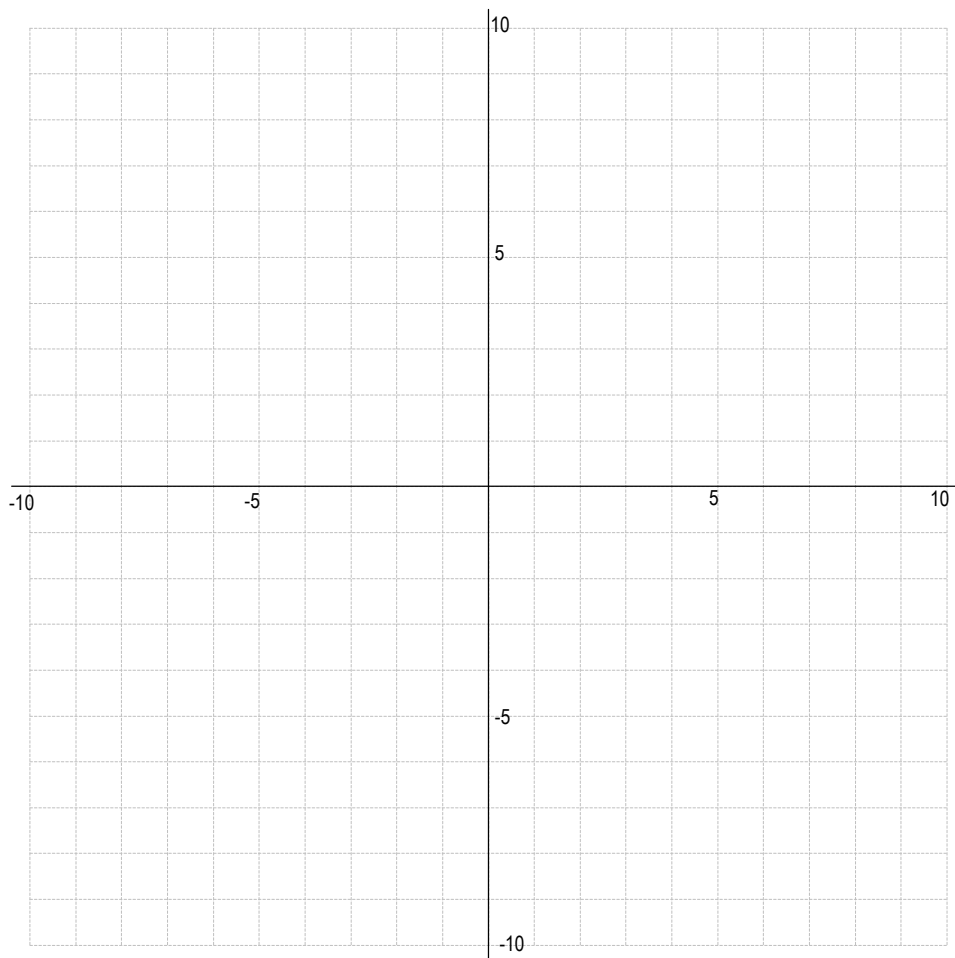
(6) Given *Figure R* on the coordinate plane shown below, a similarity transformation consists of a dilation from  $(0,6)$  with a scale factor of  $\frac{1}{4}$ , followed by a reflection over a line  $x = -1$ , then by a vertical translation of 5 units down. Find the image of *Figure R*.



(7) **Homework**

cont.

(7) Given  $\triangle ABC$ , with vertices  $A(2,-7)$ ,  $B(-2,-1)$ ,  $C(3,-4)$ , locate and label the image of the triangle under the similarity transformation  $D_{B, \frac{1}{2}} \left( R_{A, 120^\circ} \left( r_{x=2} (ABC) \right) \right)$ .

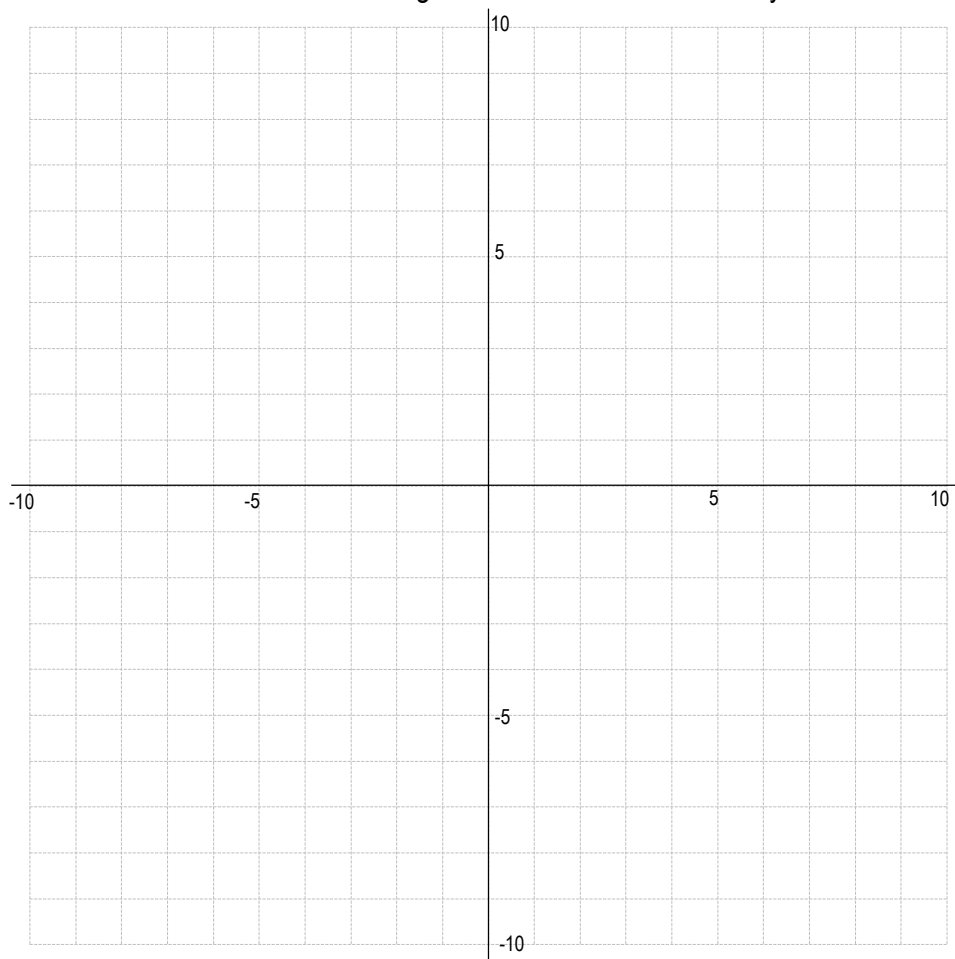


(8) In problem 7, describe the relationship of  $A'''$  to line segment  $AB'$ , and explain your reasoning.

(7) **Homework**

cont.

(9) Given  $O(8,3)$  and quadrilateral  $BCDE$ , with  $B(-5,1)$ ,  $C(-6,-1)$ ,  $D(-4,-1)$ , and  $E(-4,2)$ , what are the coordinates of the vertices of the image of  $BCDE$  under the similarity transformation  $r_{x\text{-axis}} \left( D_{O,3} (BCDE) \right)$ .



(10) Respond to each prompt below. (Lesson 5.8 may be helpful).

(a) In the coordinate plane, name the single transformation that is the result of the composition of the two dilations:

$D_{(0,0),2}$  followed by  $D_{(0,4),\frac{1}{2}}$ .

(b) In the coordinate plane, name the single transformation that is the result of the composition of the two dilations:

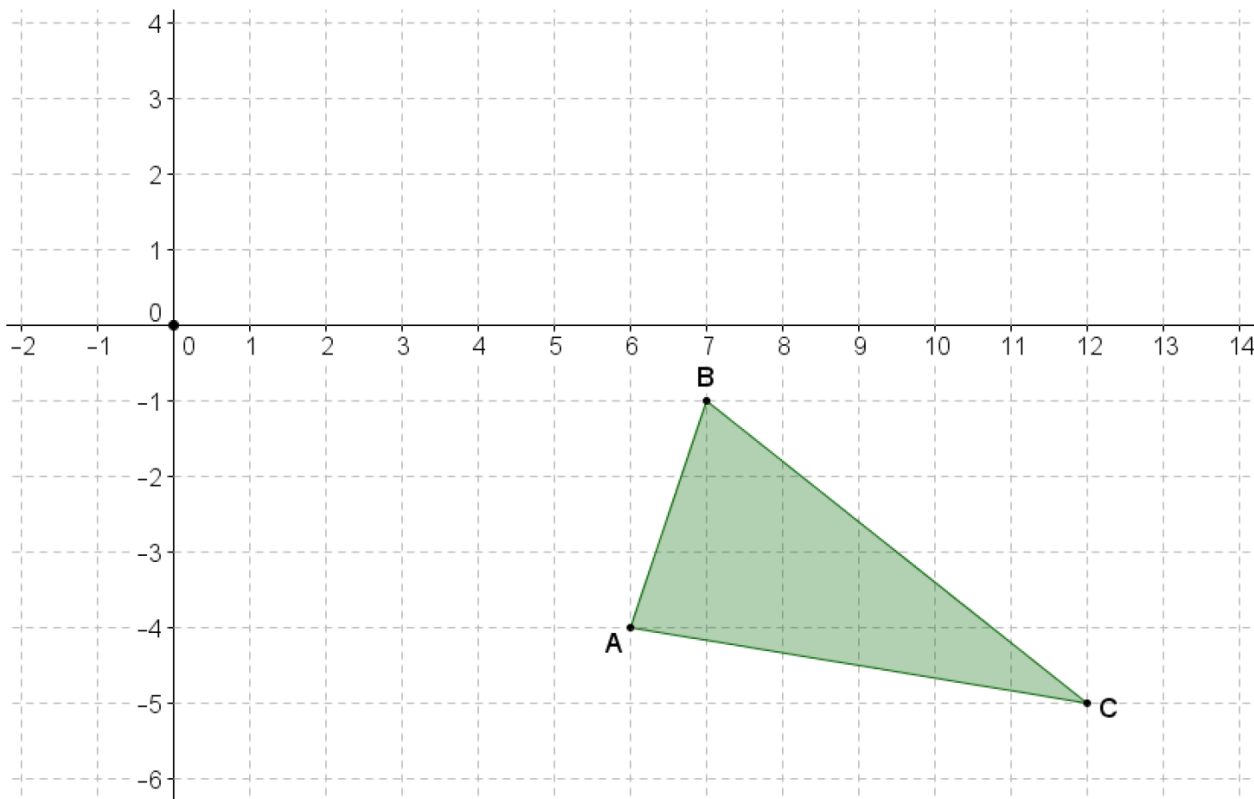
$D_{(0,0),2}$  followed by  $D_{(4,4),\frac{1}{2}}$ .

(c) Using the results from parts (a) and (b), compare the location of the center of dilation for the single transformation to the locations of the centers for each dilation in the composition.

(7) **Homework**  
cont.

(11) Given  $\triangle ABC$  as shown on the diagram of the coordinate plane:

- Perform a translation so that vertex  $A$  maps to the origin.
- Next, dilate the image  $A'B'C'$  from the origin using a scale factor of  $1/3$ .
- Finally, translate the image  $A''B''C''$  so that the vertex  $A''$  maps to the original point  $A$ .
- Using transformations, describe how the resulting image  $A'''B'''C'''$  relates to the original figure  $ABC$ .



# Exit Ticket

6.2

A similarity transformation consists of a translation along the vector  $\overrightarrow{FG}$ , followed by a dilation from point  $P$  with a scale factor  $r = 2$ , and finally a reflection over line  $m$ . Use construction tools to find  $A'''C'''D'''E'''$ .

