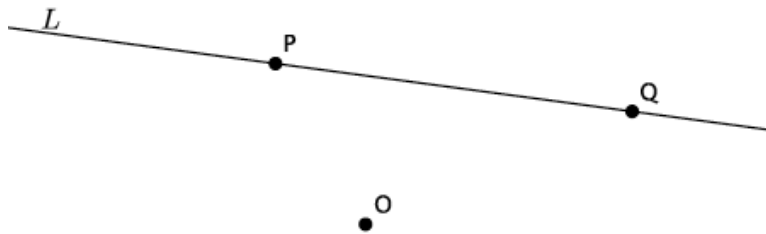


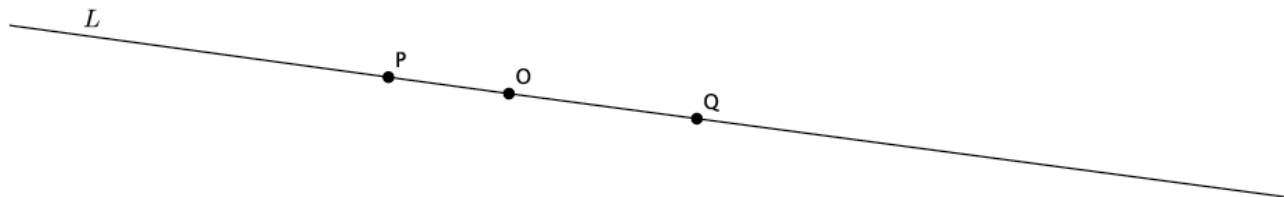
## Lesson 2: Properties of Dilations

### Classwork

#### Examples 1–2: Dilations Map Lines to Lines

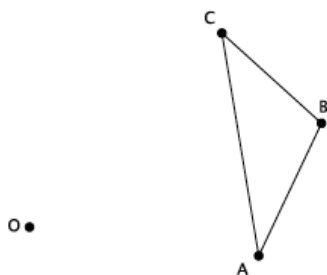


**Example 3: Dilations Map Lines to Lines**



**Exercise**

Given center  $O$  and triangle  $ABC$ , dilate the triangle from center  $O$  with a scale factor  $r = 3$ .



- a. Note that the triangle  $ABC$  is made up of segments  $AB$ ,  $BC$ , and  $CA$ . Were the dilated images of these segments still segments?

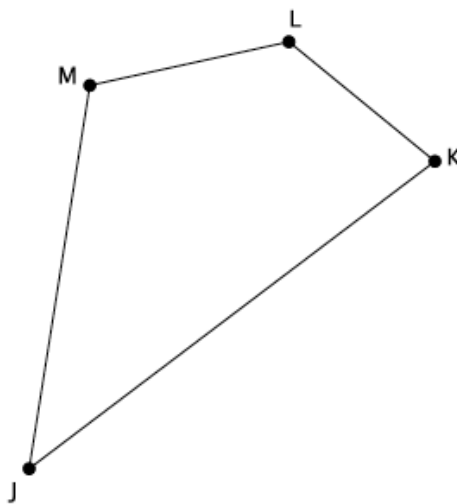
- b. Measure the length of the segments  $AB$  and  $A'B'$ . What do you notice? (Think about the definition of dilation.)
- c. Verify the claim you made in part (b) by measuring and comparing the lengths of segments  $BC$  and  $B'C'$  and segments  $CA$  and  $C'A'$ . What does this mean in terms of the segments formed between dilated points?
- d. Measure  $\angle ABC$  and  $\angle A'B'C'$ . What do you notice?
- e. Verify the claim you made in part (d) by measuring and comparing the following sets of angles: (1)  $\angle BCA$  and  $\angle B'C'A'$  and (2)  $\angle CAB$  and  $\angle C'A'B'$ . What does that mean in terms of dilations with respect to angles and their degrees?

**Lesson Summary**

Dilations map lines to lines, rays to rays, and segments to segments. Dilations map angles to angles of the same degree.

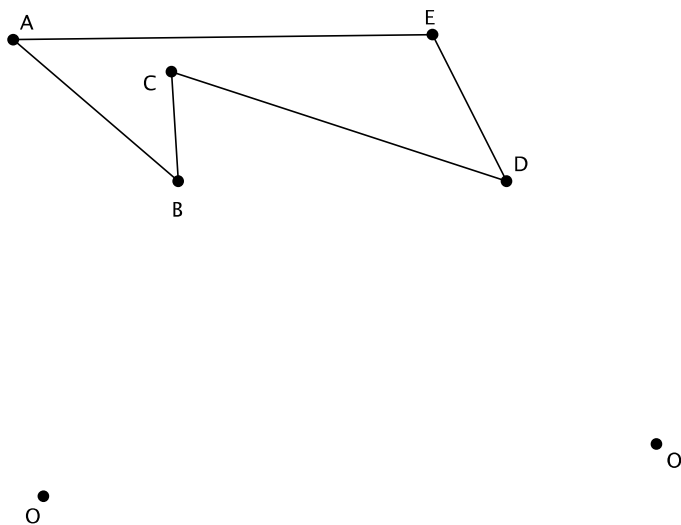
**Problem Set**

1. Use a ruler to dilate the following figure from center  $O$ , with scale factor  $r = \frac{1}{2}$ .



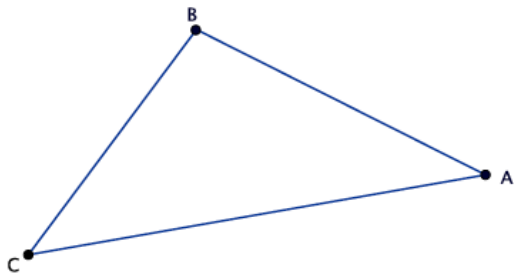
•<sup>o</sup>

2. Use a compass to dilate the figure  $ABCDE$  from center  $O$ , with scale factor  $r = 2$ .



- a. Dilate the same figure,  $ABCDE$ , from a new center,  $O'$ , with scale factor  $r = 2$ . Use double primes ( $A''B''C''D''E''$ ) to distinguish this image from the original.
- b. What rigid motion, or sequence of rigid motions, would map  $A''B''C''D''E''$  to  $A'B'C'D'E'$ ?

3. Given center  $O$  and triangle  $ABC$ , dilate the figure from center  $O$  by a scale factor of  $r = \frac{1}{4}$ . Label the dilated triangle  $A'B'C'$ .



4. A line segment  $AB$  undergoes a dilation. Based on today's lesson, what is the image of the segment?
5.  $\angle GHI$  measures  $78^\circ$ . After a dilation, what is the measure of  $\angle G'H'I'$ ? How do you know?