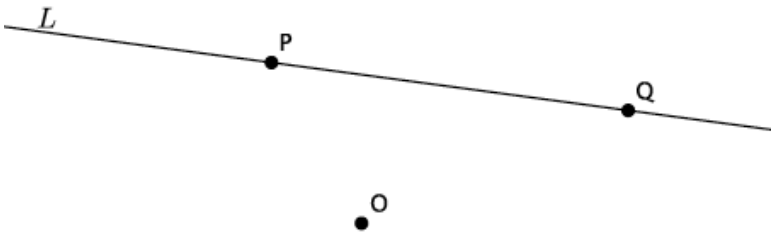
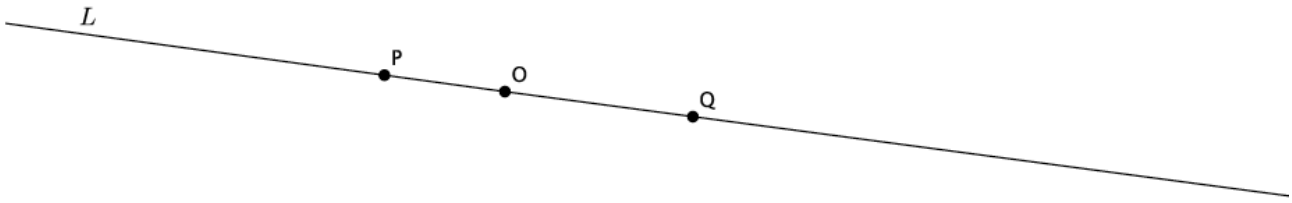
Lesson 2: Properties of Dilations

Classwork

Examples 1–2: Dilations Map Lines to Lines

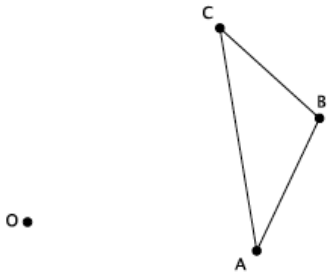


Example 3: Dilations Map Lines to Lines



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?

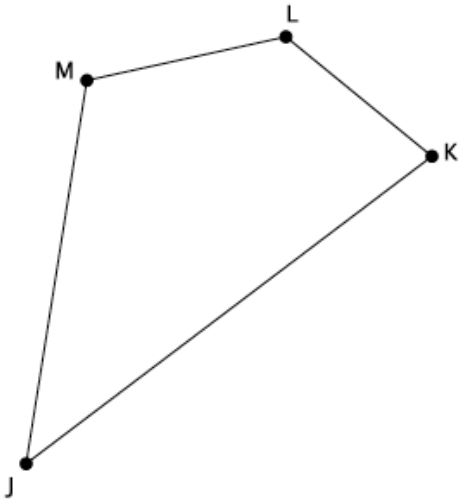
e. Verify the claim you made in part (d) by measuring and comparing $\angle BCA$ and $\angle B'C'A'$ and $\angle CAB$ and $\angle C'A'B'$. What does that mean in terms of dilations with respect to angles and their degrees?

Lesson Summary

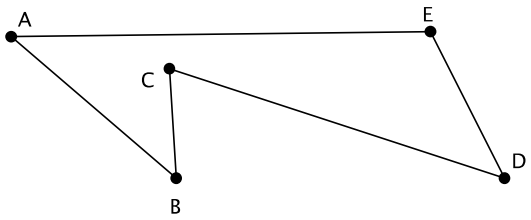
Dilations map lines to lines, rays to rays, and segments to segments. Dilations map angles to angles of the same degree.

Problem Set

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



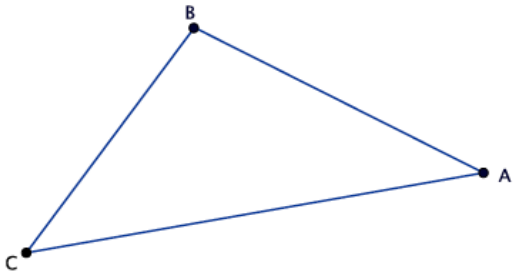
2. Use a compass to dilate the figure $ABCDE$ from center O, with scale factor $r = 2$.



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 will the image of the segment be?

5. Angle $\angle GHI$ measures $78°$. After a dilation, what will the measure of $\angle G'H'I'$ be? How do you know?