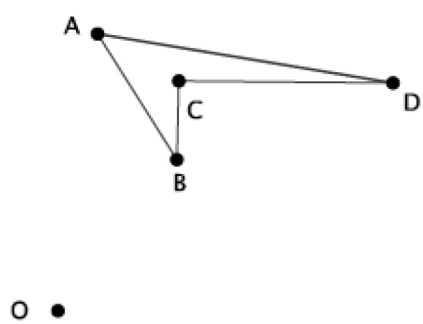
Name _____ Date_____

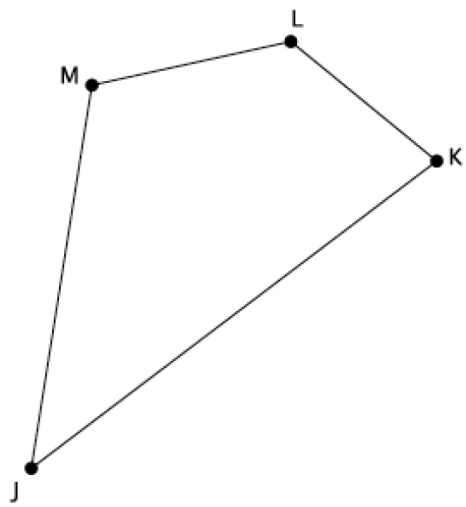
Properties of Dilations

1. Given center O and quadrilateral $ABCD$, using a compass and ruler, dilate the figure from center O by a scale factor of $r = 2$. Label the dilated quadrilateral $A'B'C'D'$.

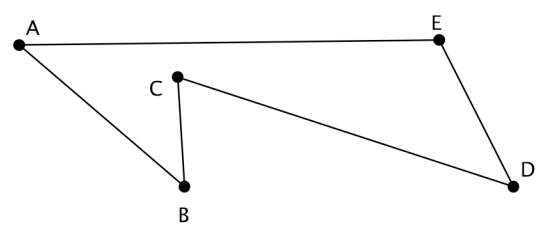


2. Describe what you learned today about what happens to lines, segments, rays, and angles after a dilation.

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



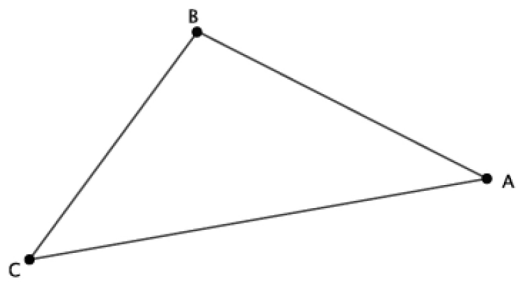
2. Use a compass to dilate the figure $ABCDE$ from center O, with scale factor $r = 2$.



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 $A'B'C'$.

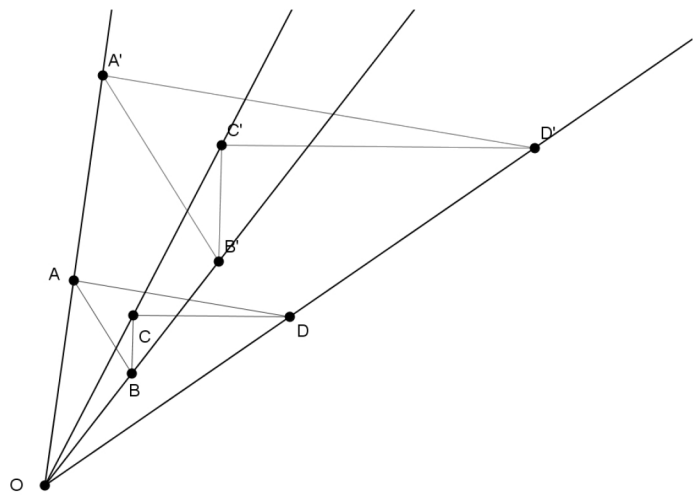


4. A line segment AB undergoes a dilation. Based on today's lesson, what will the image of the segment be?

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

1. **Given center O and quadrilateral $ABCD$, using a compass and ruler, dilate the figure from center O by a scale factor of $r = 2$. Label the dilated quadrilateral $A'B'C'D'$.**

   Sample student work shown below. Verify that students have magnified the image $ABCD$.



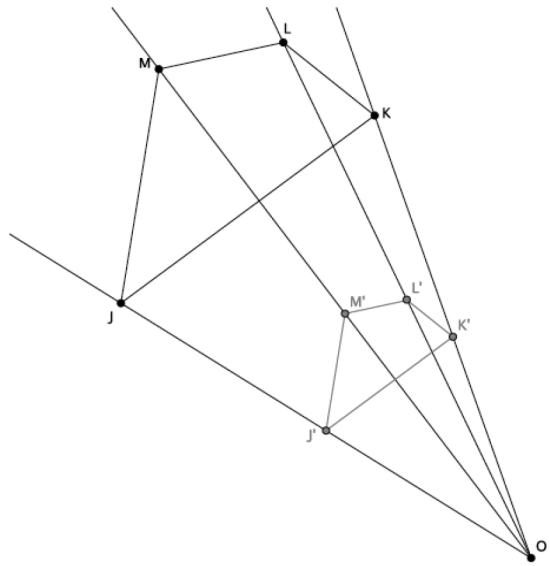
2. **Describe what you learned today about what happens to lines, segments, rays, and angles after a dilation.**

   We learned that a dilation will map a line to a line, a segment to a segment, a ray to a ray, and an angle to angle. Further, the length of the dilated line segment will be exactly r (the scale factor) times the length of the original segment. Also, the measure of a dilated angle will remain unchanged compared to the original angle.

Students practice dilating figures with different scale factors.

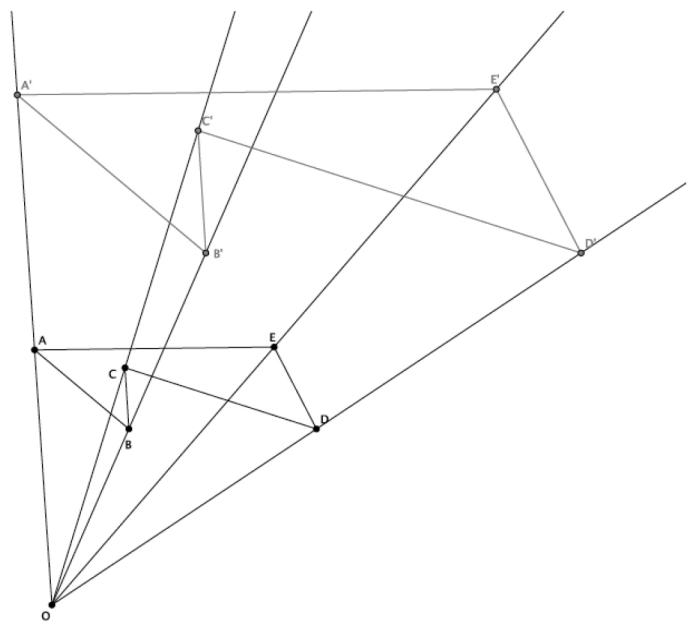
1. **Use a ruler to dilate the following figure from center O, with scale factor $r = \frac{1}{2}$.**

   The dilated figure is shown in red below. Verify that students have dilated according to the scale factor $r = \frac{1}{2}$.



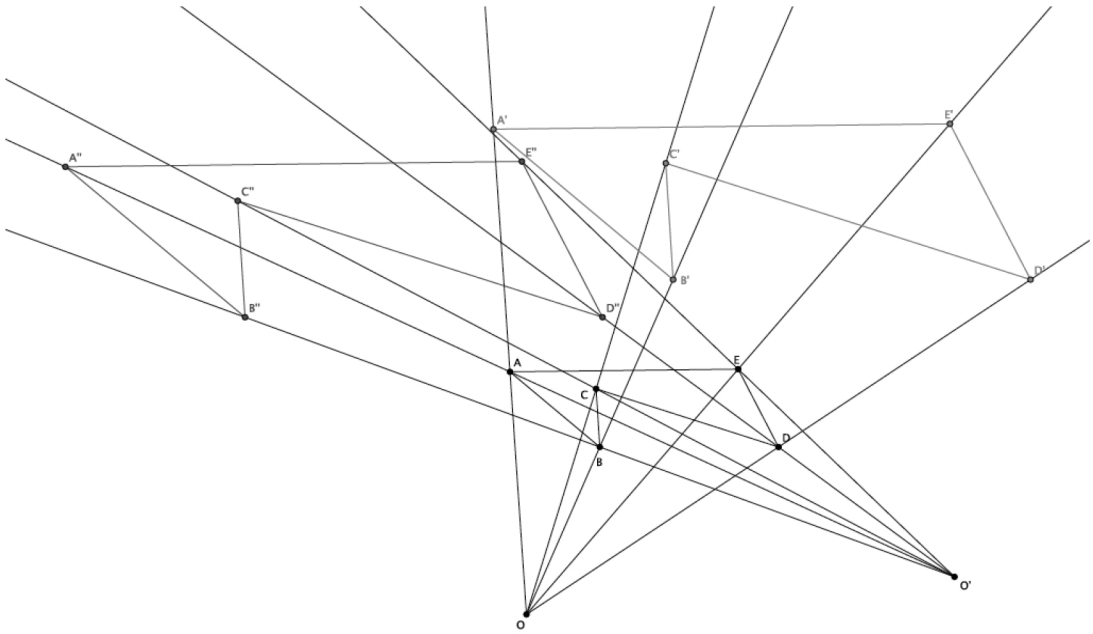
2. **Use a compass to dilate the figure $ABCDE$ from center O, with scale factor $r = 2$.**

   The figure in red, below, shows the dilated image of $ABCDE$.



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.

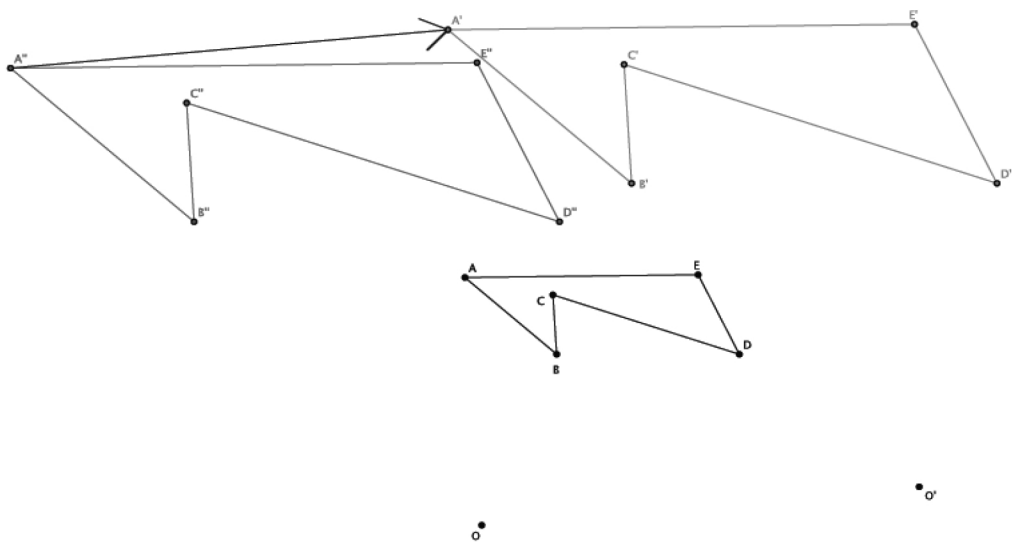
The figure in blue, below, shows the dilated figure $A''B''C''D''E''$.



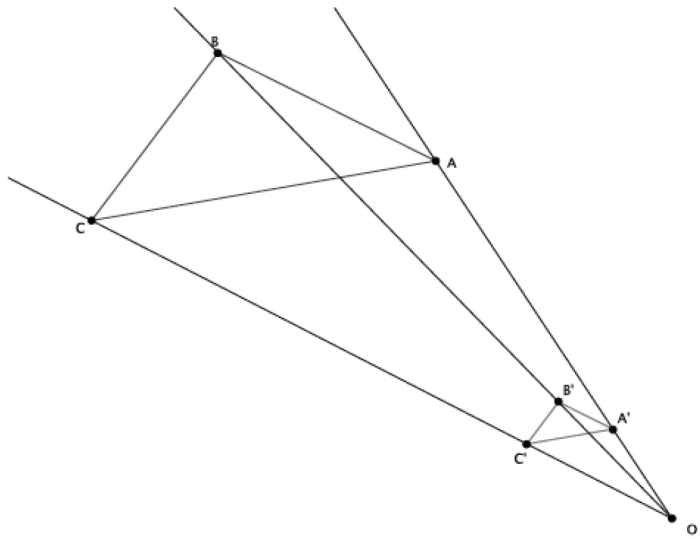
b. What rigid motion, or sequence of rigid motions, would map $A''B''C''D''E''$ to $A'B'C'D'E'$?

A translation along vector $\overrightarrow{A''A'}$ (or any vector that connects a point of $A''B''C''D''E''$ and its corresponding point of $A'B'C'D'E'$) would map the figure $A''B''C''D''E''$ to $A'B'C'D'E'$.

The image below (with rays removed for clarity) shows the vector $\overrightarrow{A''A'}$.



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?

The segment will dilate as a segment.

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

The measure of angle $\angle G'H'I'$ will be $78°$. Dilations preserve angle measure, so it will remain the same size as $\angle GHI$.