Objective: In this lesson, you will verify experimentally the properties of dilations given by a center and a scale factor.

Dilations - _________________________________________________________________________________________

__________________________________________________________________________________________________

If a line segment in the preimage or the line on which the line segment lies contains the center of dilation, _____

__________________________________________________________________________________________________

However, if the line on which a line segment in the preimage lies does not pass through the center of dilation,  

Example

Polygon $ABCDE$ is dilated by a scale factor of 3 with the center of dilation at the origin to create polygon $A'B'C'D'E'$. If the endpoints of $BC$ are $B(3, 5)$ and $C(5, 10)$, what is the slope of $B'C'$?

Use the slope formula to find the slope of the line segment.

$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1}$$
This square has been dilated by a scale factor of $n = 2$. The length of each line segment in the image is two times the length of the corresponding line segment in the preimage.

**Example**

Polygon $ABCD$ is dilated by a scale factor of 2 with the center of dilation at the origin to create polygon $A'B'C'D'$. If the endpoints of $AB$ are located at $(0, -7)$ and $(8, 8)$, what is the length of $A'B'$? Use the distance formula to help you decide:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
Summary

All line segments that lie on lines passing through the center of dilation are ________________________________

__________________________________________________________________________________________________

Line segments on other lines (lines that do not pass through the center of dilation) are __________________

__________________________________________________________________________________________________

If a line segment in a preimage contains the center of dilation, ________________________________

A dilation always preserves ________________________________

A dilation changes ________________________________

The ratio of the length of any line segment in the image to the length of the corresponding line segment in the preimage is ________________________________