Lesson 5: First Consequences of FTS

Classwork

Exercise 1

In the diagram below, points $P$ and $Q$ have been dilated from center $O$ by scale factor $r$. $ PQ∥P'Q'$, $\left|PQ\right|=5$ cm, and $\left|P'Q'\right|=10$ cm.



* 1. Determine the scale factor $r$.
	2. Locate the center $O$ of dilation. Measure the segments to verify that $\left|OP'\right|=r\left|OP\right|$ and$\left|OQ'\right|=r\left|OQ\right|$*.* Show your work below.

**Exercise 2**

In the diagram below, you are given center $O$ and ray $\vec{OA}$. Point $A$is dilated by a scale factor $r=4$. Use what you know about FTS to find the location of point $A'$.

Exercise 3

In the diagram below, you are given center $O$ and ray $\vec{OA}$. Point $A$is dilated by a scale factor $r=\frac{5}{12}$. Use what you know about FTS to find the location of point $A'$.

Lesson Summary

Converse of the Fundamental Theorem of Similarity:

*If lines* $PQ$ *and* $P'Q'$ *are parallel, and* $\left|P'Q'\right|=r\left|PQ\right|,$ *then from a center* $O$*,* $P'=Dilation(P)$*,* $Q'=Dilation(Q)$*,* $\left|OP'\right|=r\left|OP\right|,$ *and* $\left|OQ'\right|=r\left|OQ\right|$*.*

To find the coordinates of a dilated point, we must use what we know about FTS, dilation, and scale factor.

Problem Set

1. Dilate point $A,$ located at $(3, 4)$ from center $O,$ by a scale factor $r=\frac{5}{3}$.

What is the precise location of point $A'$?

1. Dilate point $A,$ located at $(9, 7)$ from center $O,$ by a scale factor $r=\frac{4}{9}$. Then dilate point $B,$ located at $(9, 5)$ from center $O$, by a scale factor of $r=\frac{4}{9}$. What are the coordinates of $A'$ and $B'$? Explain.
2. Explain how you used the Fundamental Theorem of Similarity in Problems 1 and 2.