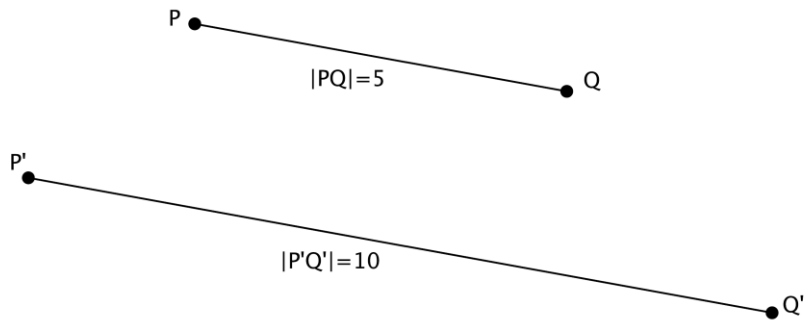
Lesson 5: First Consequences of FTS

Classwork

Exercise 1

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

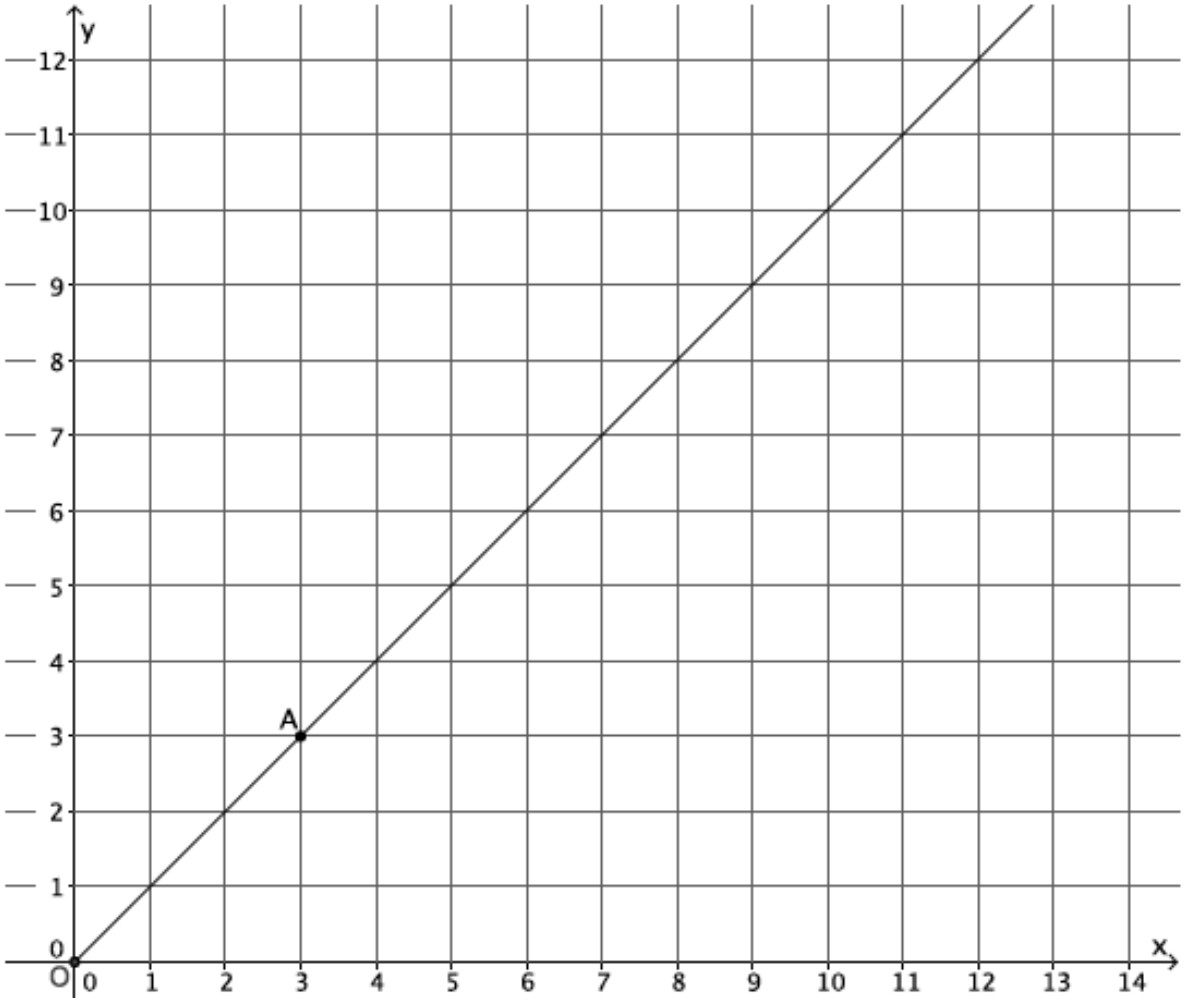


a. Determine the scale factor r.

b. Locate the center O of dilation. Measure the segments to verify that $|OP'| = r|OP|$ and $|OQ'| = r|OQ|$. Show your work below.

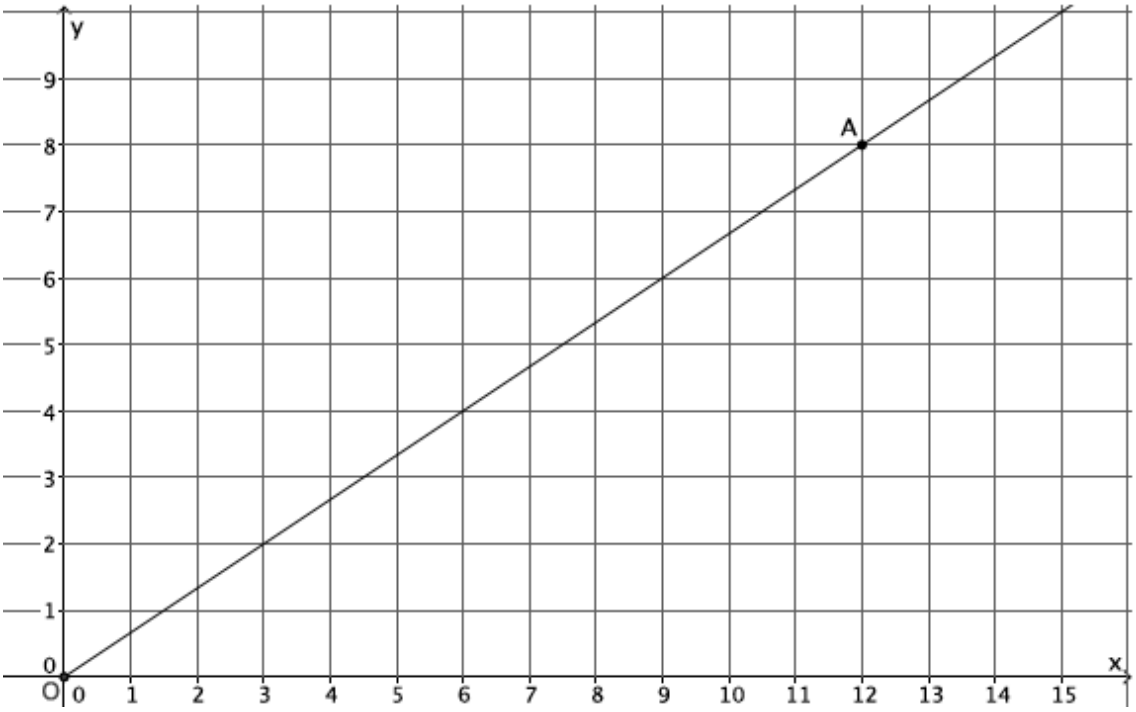
Exercise 2

In the diagram below, you are given center O and ray $\overrightarrow{OA}$. 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 $\overrightarrow{OA}$. 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

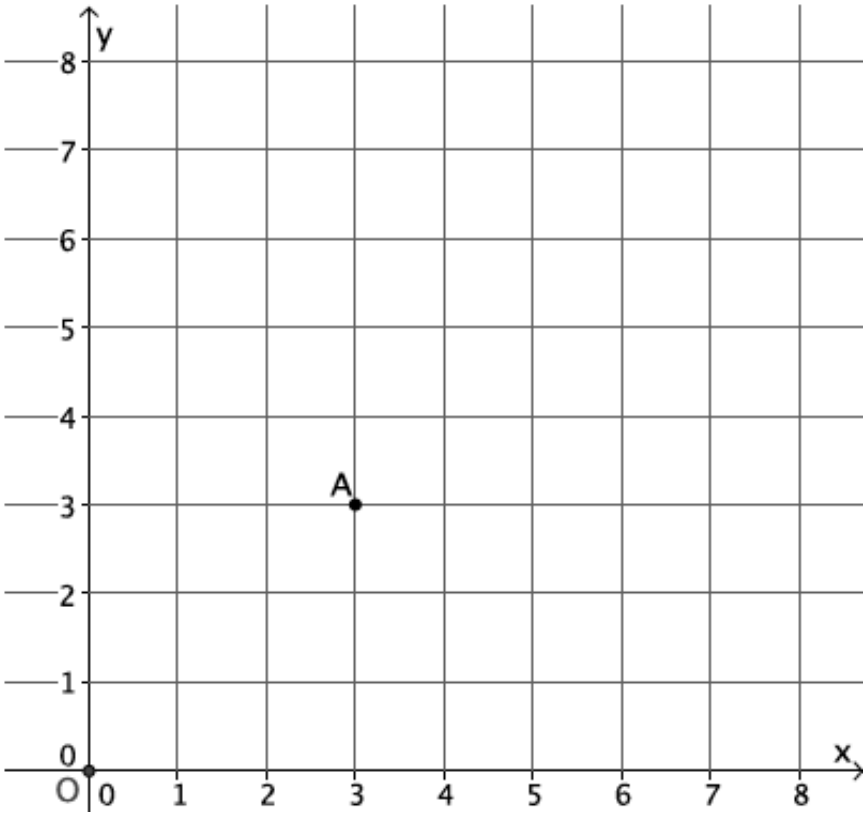
Converse of the fundamental theorem of similarity:

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

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

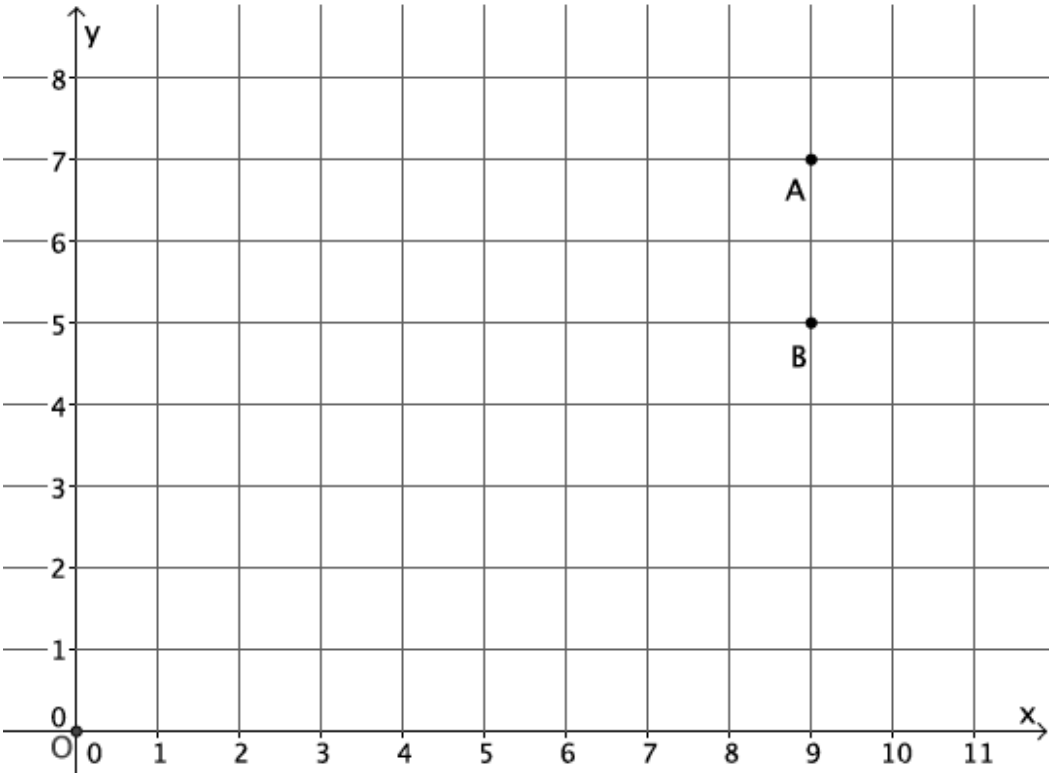
Problem Set

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'?

2. 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 points A' and B'? Explain.



3. Explain how you used the fundamental theorem of similarity in Problems 1 and 2.