

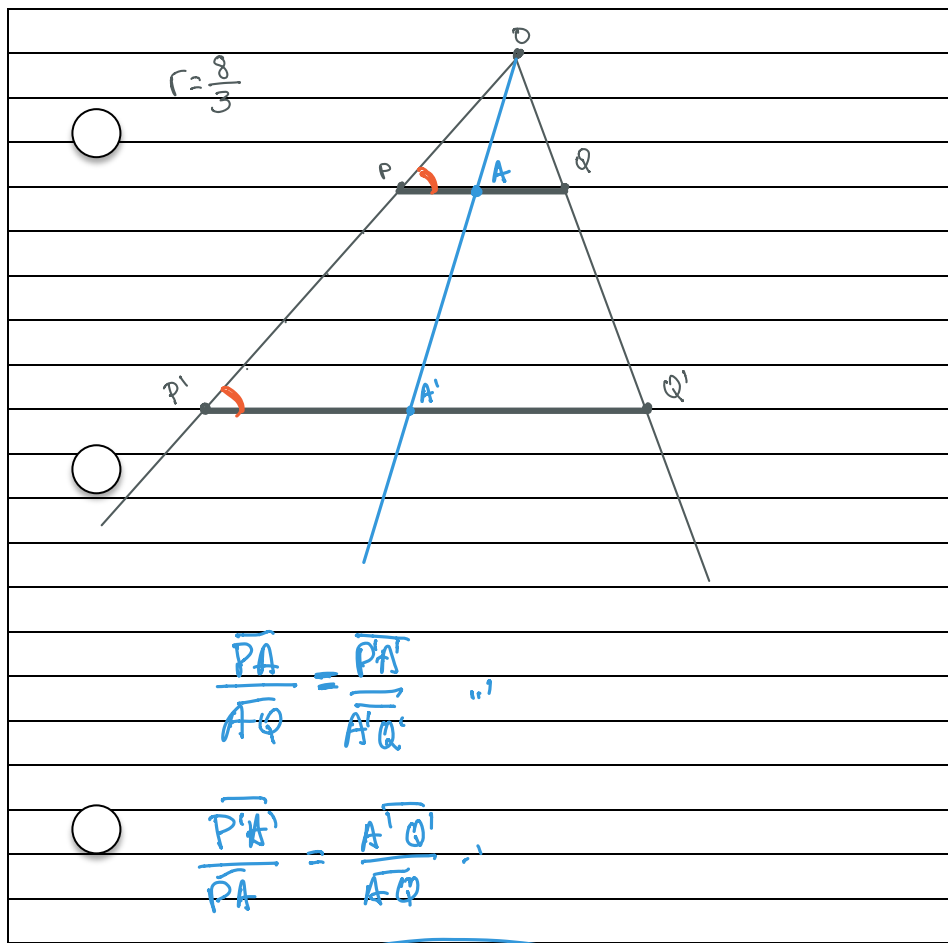
LEARNING OBJECTIVE:

We will verify the Fundamental Theorem of Similarity (G8M3L4)

CONCEPT DEVELOPMENT:

The Fundamental Theorem of Similarity (FTS): Given a dilation with center O and scale factor r , then for any two points P and Q in the plane so that $O, P,$ and Q are not collinear, the lines PQ and $P'Q'$ are parallel, where $P' = \text{dilation}(P)$ and $Q' = \text{dilation}(Q)$ and furthermore $|P'Q'| = r|PQ|$.

"Lined Paper" Proof



$\overline{OP} = 2.2 \text{ cm}$
 $\overline{OP'} = 5.8 \text{ cm}$

$r = \frac{8}{3}$

$\overline{OQ} = 1.8 \text{ cm}$
 $\overline{OQ'} = 4.5 \text{ cm}$

$\frac{P'Q'}{PQ} = \frac{8}{3}$

$PQ = 2$

$P'Q' = 5.4$

$\frac{\overline{PA}}{\overline{AQ}} = \frac{\overline{P'A'}}{\overline{A'Q'}} \quad \dots$

$\frac{\overline{P'A'}}{\overline{P'A}} = \frac{\overline{A'Q'}}{\overline{AQ}} \quad \dots$

1. On line 2, mark O.
2. 3 lines below, mark P.
3. Draw ray \overrightarrow{OP}
4. Mark P'
5. Measure scale factor.
6. Mark Q.
7. Draw \overrightarrow{OQ}
8. Mark Q' w/same scale factor.
9. Measure \overline{OQ}
10. Connect \overline{PQ} and $\overline{P'Q'}$
11. Mark A on line \overline{PQ} .
12. Draw ray \overrightarrow{OA}
13. Mark A'

$\angle OPQ \cong \angle OP'Q'$
 CORRESPONDING.

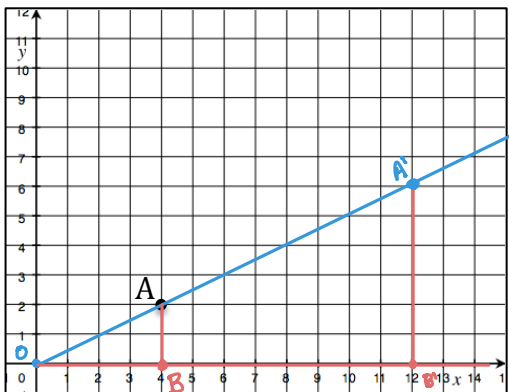
$\overline{PQ} \parallel \overline{P'Q'}$

GUIDED PRACTICE:

How to use the FTS to Determine Points of Dilation on a Coordinate Plane

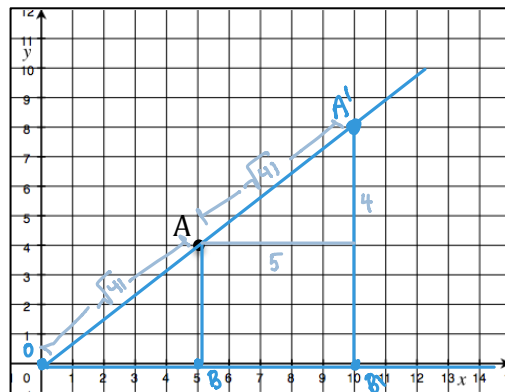
1. Locate the center of dilation (for this lesson, it will be the origin).
2. Locate the original point that is being dilated. Draw a ray from the origin through the point and label the point A.
3. Draw a vertical line from Point A to the x-axis, and label the point of intersection with the x-axis B.
4. Find B' by multiplying the distance of segment OB by the given scale factor.
5. Draw a vertical line from B' to the ray OA. The point of intersection with your ray is the dilation of A.

Find A' when A is dilated from the origin by a scale factor of 3.



$A' (12, 6)$

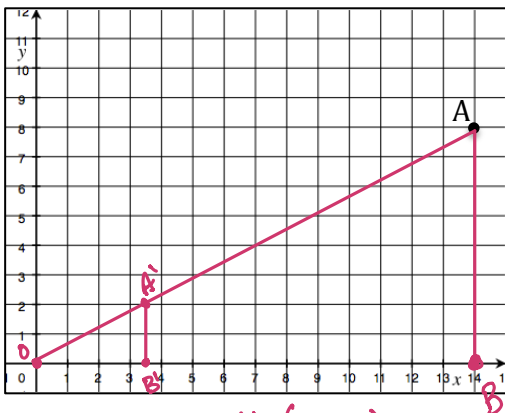
Find A' when A is dilated from the origin by a scale factor of 2.



$A' (10, 8)$

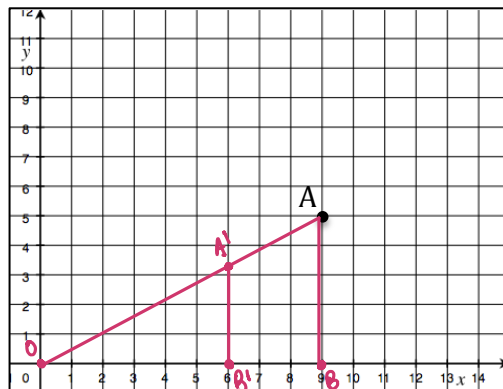
$OA' = \sqrt{164} = 2\sqrt{41}$
 $OA = \sqrt{41}$
 $AA' = \sqrt{41}$

Find A' when A is dilated from the origin by a scale factor of $\frac{1}{4}$.



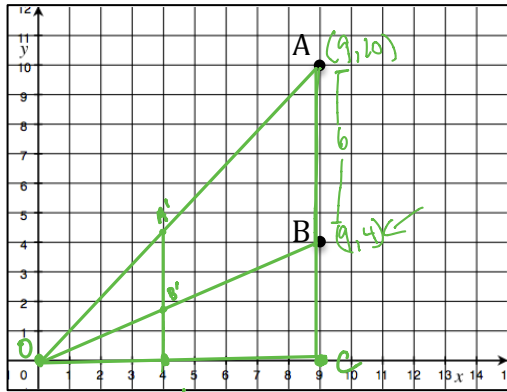
$\frac{1}{4} \times 14 = 3.5$ $A' (3.5, 2)$

Find A' when A is dilated from the origin by a scale factor of $\frac{2}{3}$.



$A' (6, \frac{10}{3})$

Find A' and B' when A and B are dilated from the origin by a scale factor of $\frac{4}{9}$.



$$\frac{4}{9} \times \frac{9}{1} = 4$$

$$A' \left(4, \frac{40}{9} \right)$$

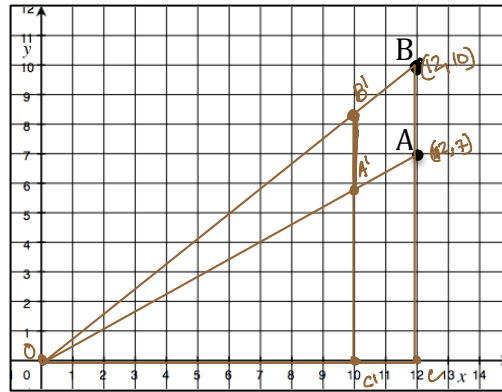
$$B' \left(4, \frac{16}{9} \right)$$

$$\overline{A'B'} = 6 \cdot \frac{4}{9} = \frac{24}{9}$$

$$\overline{A'B'} = \overline{A'C'} - \overline{B'C'}$$

$$\frac{40}{9} - \frac{16}{9} = \frac{24}{9}$$

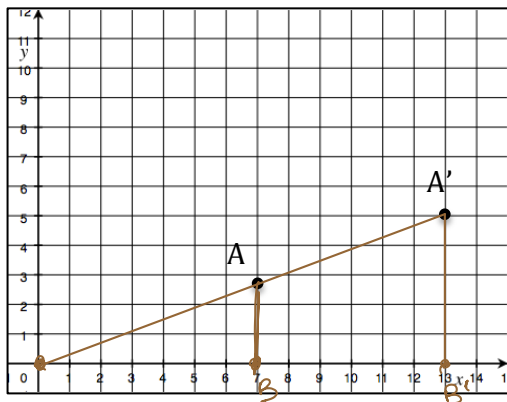
Find A' and B' when A and B are dilated from the origin by a scale factor of $\frac{5}{6}$.



$$A' \left(10, \frac{35}{6} \right)$$

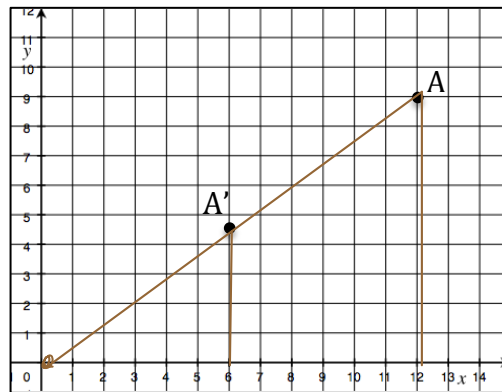
$$B' \left(10, \frac{50}{6} \right)$$

Find the scale factor of the dilation from A to A' .



$$r = \frac{13}{7}$$

Find the scale factor of the dilation from A to A' .



$$r = \frac{6}{12} = \frac{1}{2}$$

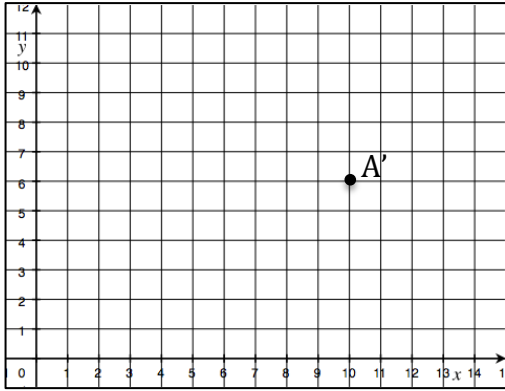
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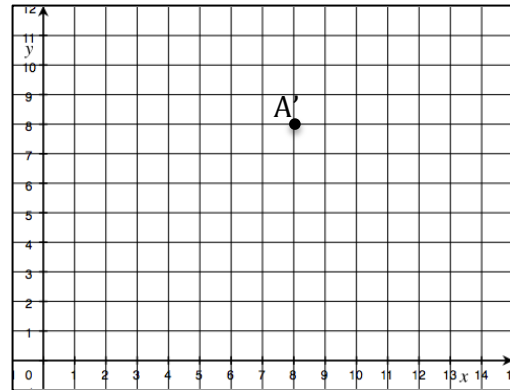
Mr. Rogove

Date: _____

Find A when A' has been dilated from the origin by a scale factor of 2.



Find A when A' has been dilated from the origin by a scale factor of $\frac{8}{5}$.



Line of Learning:

What have you learned about the concepts of similarity in general and dilations specifically?

1.

2.

3.

4.

5.

6.

4

NAME: _____

Math _____, Period _____

Mr. Rogove

Date: _____

INDEPENDENT PRACTICE:

ACTIVATING PRIOR KNOWLEDGE:

N/A

CLOSURE:

Line of Learning is Closure Activity.

TEACHER NOTES:

Might be a good idea to show the lined paper example like on page 46-47.

HW is from lesson 5....