NAME:_____ Math _____, Period 6/7

Mr. Rogove Date:_____

LEARNING OBJECTIVE: We will use a compass and a ruler to perform dilations and explore the properties of dilations. (G8M3L2)

CONCEPT DEVELOPMENT:

Properties of Dilations

- Dilations map lines to lines, segments to segments, rays to rays and angles to angles.
- The length of the dilated line segment is the length of the original line segment multiplied by the scale factor ($|OP'| = r|OP|$).
- When geometric shapes are dilated, angle measures remain the same.

IF $r > 1$, DILATED LINE IS LONGER THAN ORIGINAL LINE.

IF $0 < r < 1$ DILATED LINE SHORTER

Steps for Drawing a Dilation (of a line segment with a scale factor of 2)

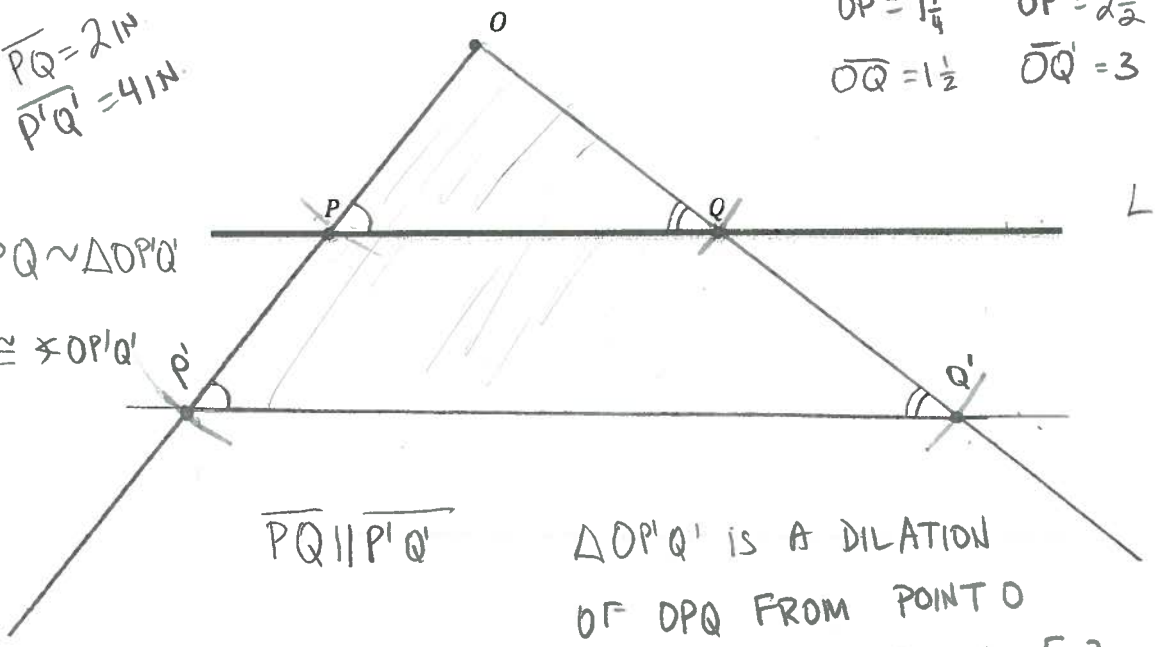
1. Draw a line L, and label two points on the line, P and Q.
2. Off from the line, draw a center and label it O.
3. Draw two rays from point O through each of the points P and Q.
4. Using a compass, put the point of the compass on point O and adjust the radius to draw an arc through point P.
5. Place the point of the compass on point P (without changing the radius) and draw another arc through the ray and mark it P'.
6. Repeat steps 4 and 5 for Point Q.
7. Connect the segment P'Q' to create the dilation of PQ with a scale factor of 2.

$\overline{OP} = 1\frac{1}{4}$ $\overline{OP'} = 2\frac{1}{2}$ $r = 2$

$\overline{OQ} = 1\frac{1}{2}$ $\overline{OQ'} = 3$ $r = 2$

$\overline{PQ} = 2$ IN

$\overline{P'Q'} = 4$ IN



$\triangle OPQ \sim \triangle OP'Q'$

$\measuredangle OPQ \cong \measuredangle OP'Q'$

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

$\triangle OP'Q'$ IS A DILATION OF OPQ FROM POINT O WITH A SCALE FACTOR OF 2

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GUIDED PRACTICE:

Steps for Drawing a Dilation (of a line segment with a scale factor of 3)

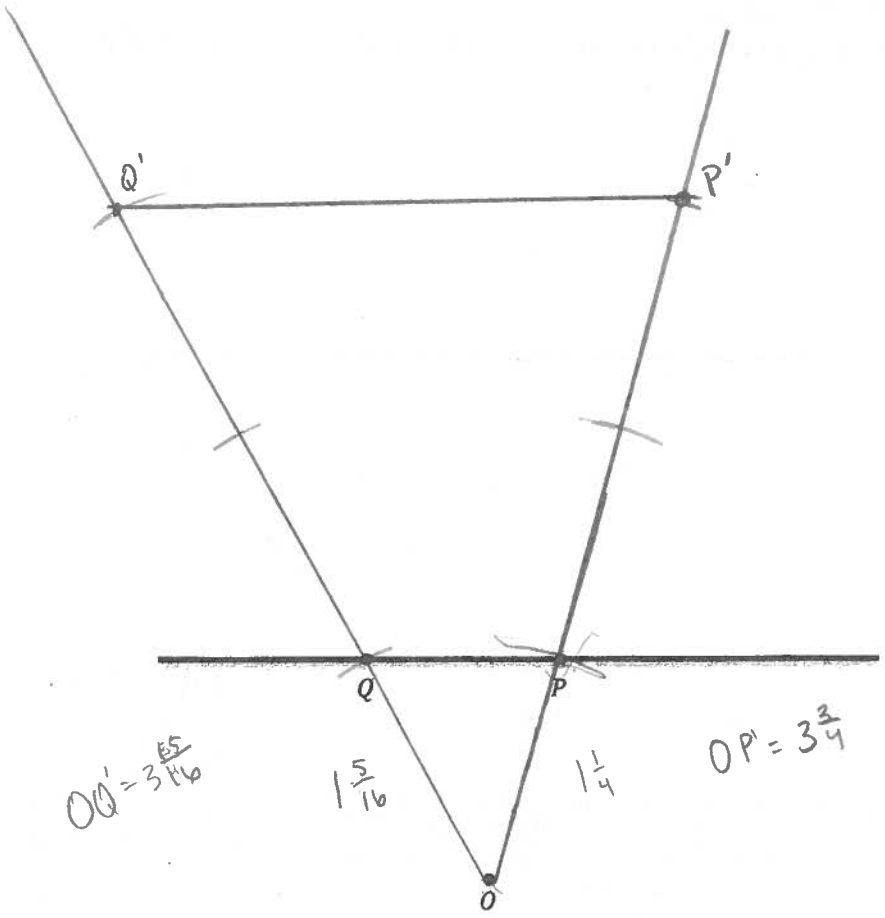
1. Draw a line *L*, and label two points on the line, *P* and *Q*.
2. Off from the line, draw a center and label it *O*.
3. Draw two rays from point *O* through each of the points *P* and *Q*.
4. Using a compass, put the point of the compass on point O and adjust the radius to draw an arc through point *P*.
5. Place the point of the compass on point *P* (without changing the radius) and draw another arc through the ray.
6. Place the point of the compass on the intersection of the ray and the arc and draw another arc through the ray extended further from the center *O*. Label it *P'*.
7. Repeat steps 4, 5, and 6 for Point *Q*.
8. Connect the segment P'Q' to create the dilation of PQ with a scale factor of 3.

Dilation from O ← center of dilation

r = 3 ← scale factor.

$\overline{PQ}$ = 1 inch

$\overline{P'Q'}$ = 3 inches



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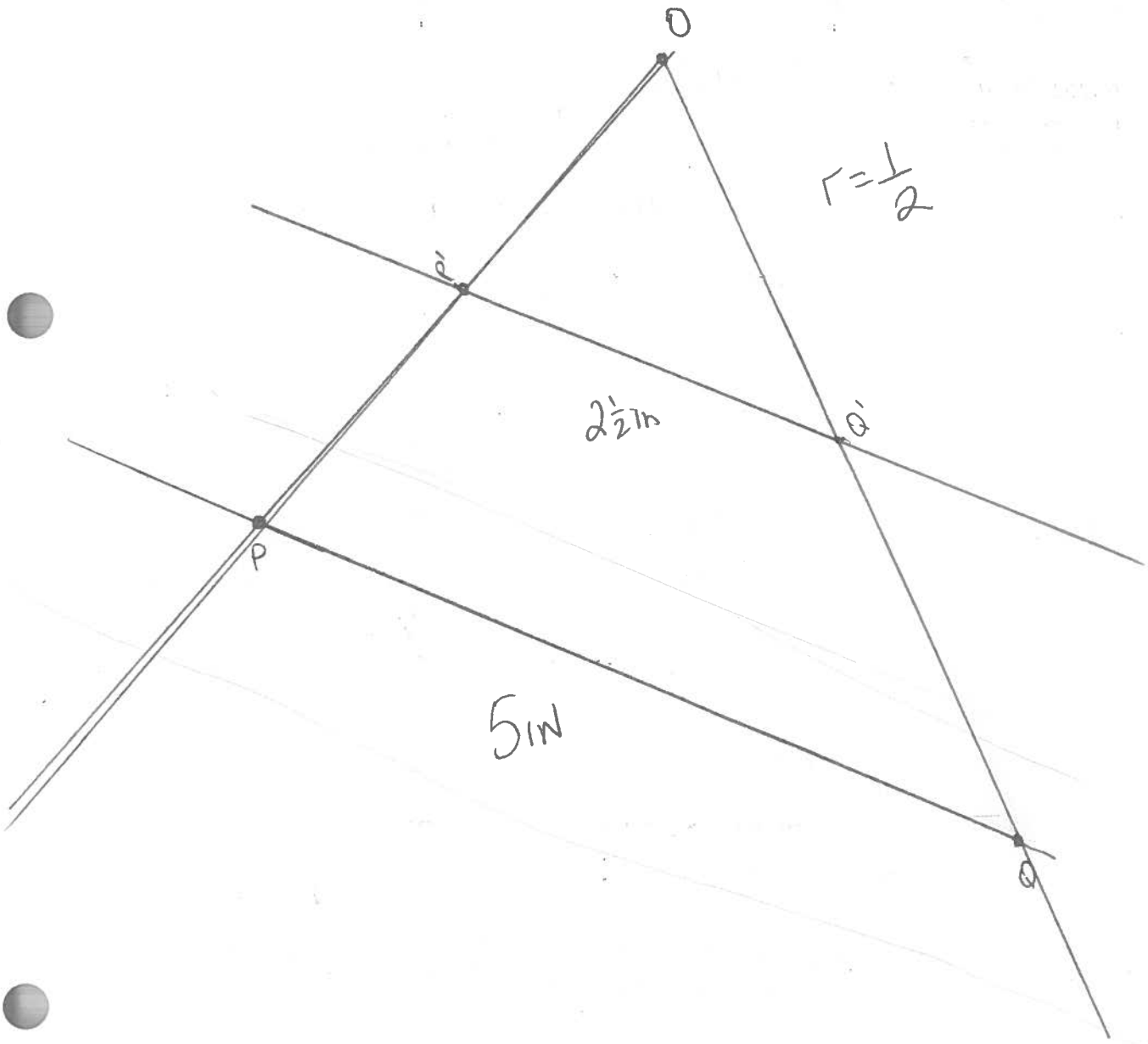
Steps for Drawing a Dilation (of a line segment with a scale factor of 1/2)

1. Draw a line *L*, and label two points on the line, *P* and *Q*.
2. Off from the line, draw a center and label it *O*.
3. Draw two rays from point *O* through each of the points *P* and *Q*.
4. Using a ruler, measure the length of line segment *OP*.
5. Divide this length in half and from center *O* on the ray, label point P'.
6. Repeats steps 4 and 5 for Point *Q*.
7. Connect the segment P'Q' to create the dilation of PQ with a scale factor of 1/2.



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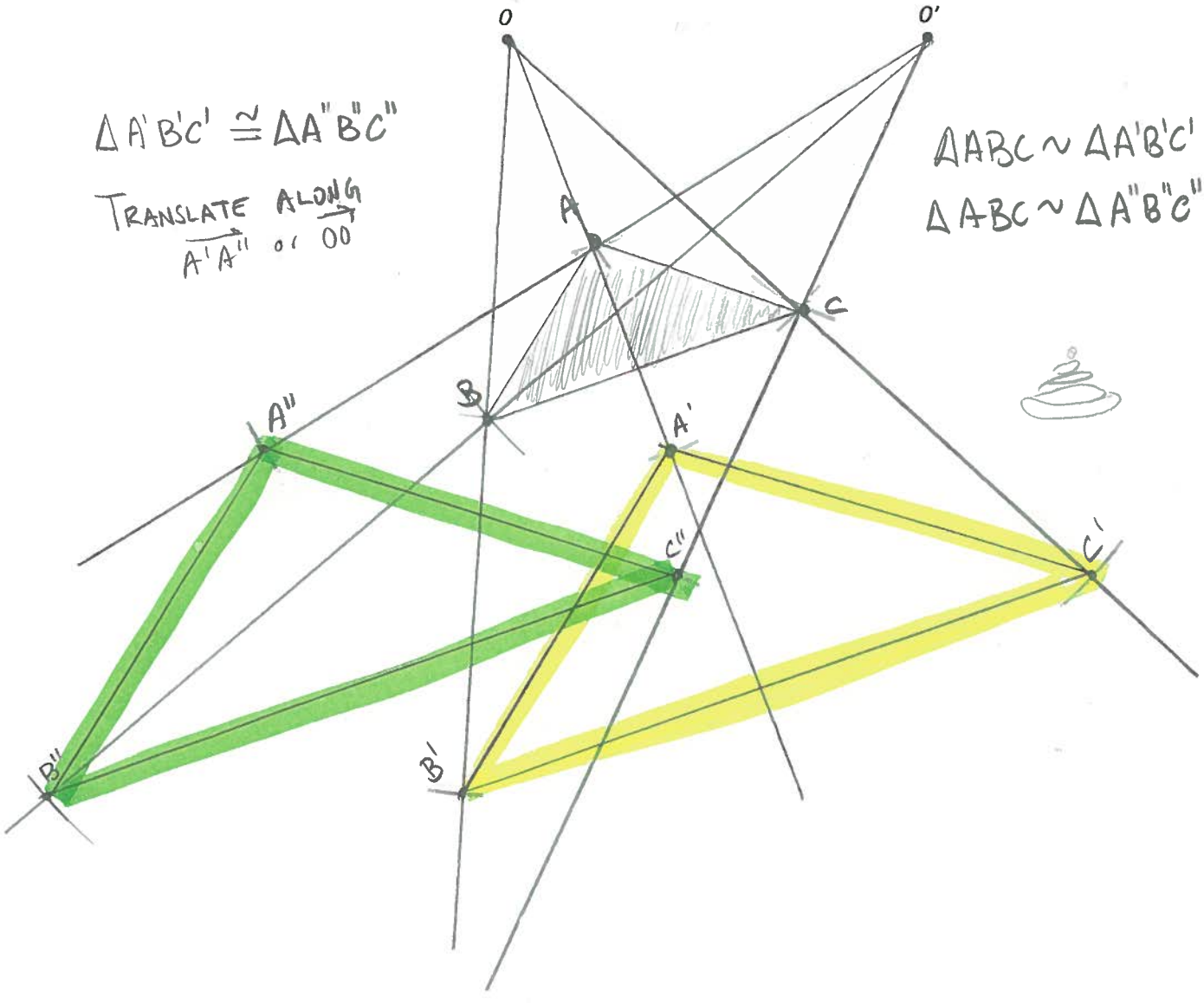
Steps for Drawing a Dilation (of a triangle with a scale factor of 2)

1. Draw a triangle, label it ΔABC.
2. Draw a center and label it O.
3. Draw three rays from point O through each of the points, A, B, and C.
4. Using a compass, put the point on Point O and adjust the radius to draw an arc through point A.
5. Without adjusting the radius, put the point of the compass on Point A and draw another arc through the ray and label it A'.
6. Repeat steps 4 and 5 for the other points.
7. Connect $A'B'$ and C' to create dilated $\Delta A'B'C'$.



$\Delta A'B'C' \cong \Delta A''B''C''$

TRANSLATE ALONG $\overrightarrow{A'A''}$ or $\overrightarrow{OO'}$

$\Delta ABC \sim \Delta A'B'C'$

$\Delta ABC \sim \Delta A''B''C''$