☐ **DO NOW – Geometry Regents Lomac 2014-2015** **Date** ____. **due** ____. **Dilation map segments, angles, rays** | **5.7**

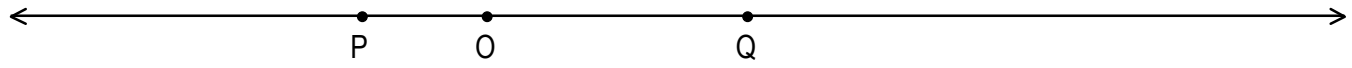
(DN) Copy and complete the statement:
When I make a scale drawing by dilating, I can verify that I have made a scale drawing by _____ and _____

Name _____**Per**_____
LO: I can perform dilations and explain how they map segments, angles, and rays.

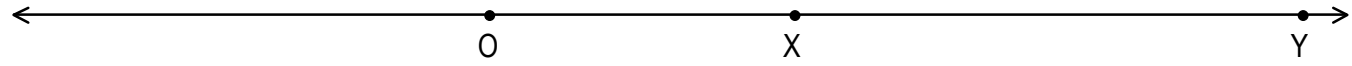
☐ (1) ruler, compass **Dilation of a segment about a center that is on the line . . .**

For each part, perform the indicated dilation.

(a) $D_{O,2}(PQ)$

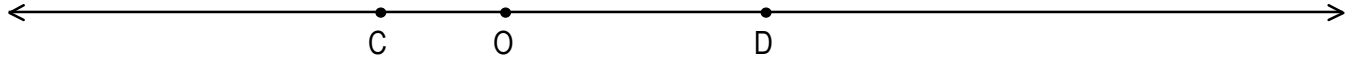


(b) $D_{O,1/2}(XY)$



(c) Describe what happens when you dilate a segment about a center point that is on the same line as the segment.

(d) $D_{O,1}(CD)$



(e) Describe what happens when you dilate a segment about a center point that is on the same line as the segment AND the scale factor is 1.

(f) For parts a, b, and d,

	(a)	(b)	(d)
verify that:	P'Q' = r (PQ)	X'Y' = r (XY)	C'D' = r (CD)
circle which happens:	$\overleftrightarrow{PQ} \parallel \overleftrightarrow{P'Q'}$ or $\overleftrightarrow{PQ} = \overleftrightarrow{P'Q'}$	$\overleftrightarrow{XY} \parallel \overleftrightarrow{X'Y'}$ or $\overleftrightarrow{XY} = \overleftrightarrow{X'Y'}$	$\overleftrightarrow{CD} \parallel \overleftrightarrow{C'D'}$ or $\overleftrightarrow{CD} = \overleftrightarrow{C'D'}$

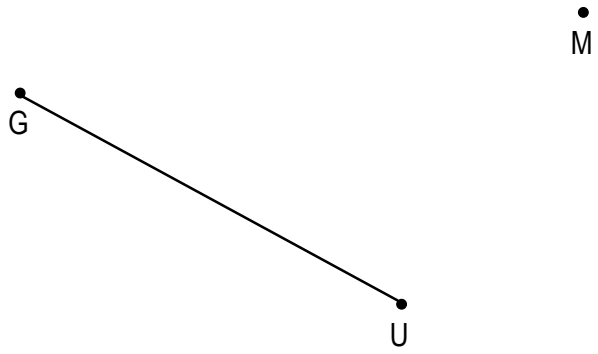
☐ (2) ruler, compass

Dilation of a segment about a center that is NOT on the line . . .

For each part, perform the indicated dilation.

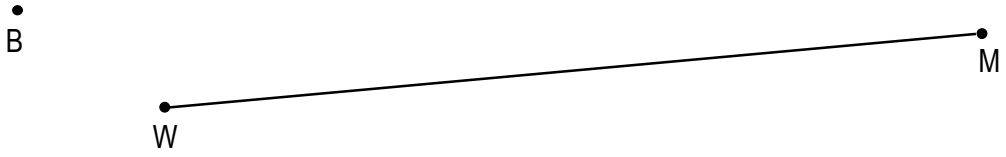
(a) $D_{J,3}(QB)$

(b) $D_{M,1/4}(UG)$



(c) Describe what happens when you dilate a segment about a center point that is NOT on the same line as the segment.

(d) $D_{B,1}(MW)$



(e) Describe what happens when you dilate a segment about a center point that is NOT on the same line as the segment AND the scale factor is 1.

(f) For parts a, b, and d,

	(a)	(b)	(d)
verify that:	Q'B' = r (QB)	G'U' = r (GU)	M'W' = r (MW)
circle which happens:	$\overleftrightarrow{QB} \parallel \overleftrightarrow{Q'B'}$ or $\overleftrightarrow{QB} = \overleftrightarrow{Q'B'}$	$\overleftrightarrow{GU} \parallel \overleftrightarrow{G'U'}$ or $\overleftrightarrow{GU} = \overleftrightarrow{G'U'}$	$\overleftrightarrow{MW} \parallel \overleftrightarrow{M'W'}$ or $\overleftrightarrow{MW} = \overleftrightarrow{M'W'}$

☐ (3) **Dilation of a segment summary**

Complete each statement:

(1) A dilation maps a segment to a segment (circle one) *always* *sometimes* *never*

(2) A dilation maps a segment to the same line when _____ or _____

_____.

(3) A dilation maps a segment to a parallel segment when _____

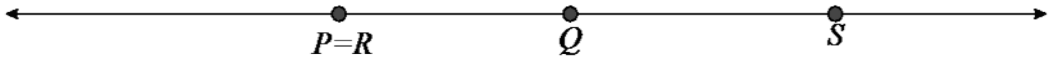
and _____.

(4) If segments of different lengths lie in the same plane, there is a dilation that maps one to the other

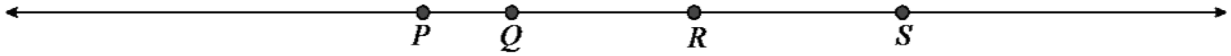
if and only if _____ or _____.

☐ (4) compass, ruler **Dilation of a segment stretch your brain**

Consider points P, Q, R, and S on a line, where P = R, as shown below. Show there is a dilation that maps PQ to RS. Where is the center of the dilation?



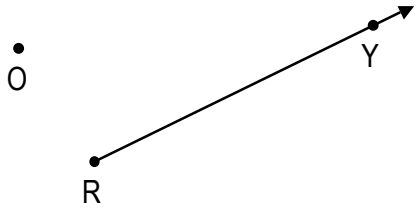
Consider points P, Q, R, and S on a line, where PQ ≠ RS, as shown below. Show there is a dilation that maps PQ to RS. Where is the center of the dilation?



☐ (5) compass, ruler **Dilation of a ray**

Predict what will happen when a ray is dilated: _____.

Dilate ray RY about center O with scale factor $r = \frac{3}{2}$.



What happens when a ray is dilated? Dilating a ray results in _____

What would change if the center lies on the ray? _____

What would change if r = 1?_____

☐ (6) compass **Dilation of a line**

Predict what will happen when a line is dilated: _____.

Dilate line LN about center O with scale factor $r = \frac{3}{4}$.

What happens when a line is dilated? Dilating a line results in _____

What would change if the center lies on the line? _____

What would change if r = 1?_____

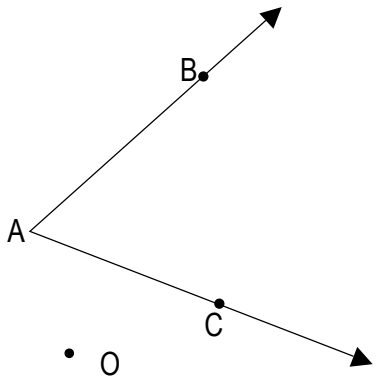
☐ (7) compass, ruler

Dilation of an angle

(a) Angles are formed by two _____ that share an endpoint (see picture if you aren't sure).

(b) Dilating a ray results in _____ (see #5).

(c) Dilate angle ABC below about point O with scale factor r = 2.



(d) $\overrightarrow{\quad} \parallel \overrightarrow{\quad}$ and $\overrightarrow{\quad} \parallel \overrightarrow{\quad}$ because rays map to _____rays under dilation

(e) Label the intersection of ray AB and ray A'C' with the letter T.

(f) ∠BAC ≅ ∠BTC' because _____

(g) ∠B'A'C' ≅ ∠BTC' because _____

(h) ∠B'A'C' ≅ ∠BAC because _____

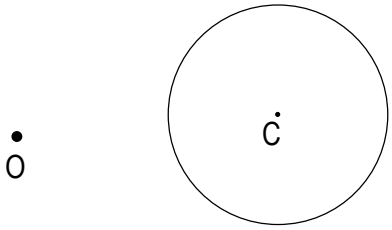
(i) Dilating an angle results in an angle _____

☐ (8) compass, ruler

Dilation of a circle

Predict what will happen when a circle is dilated: _____.

Dilate circle C about center O with scale factor r = 2. It will help to dilate point C and a few points on the circle. Name a few points, Q, R, S, T, on circle C and determine if Q', R', S', and T' lie on a circle with center C'.



What happens when a circle is dilated? Dilating a circle results in _____

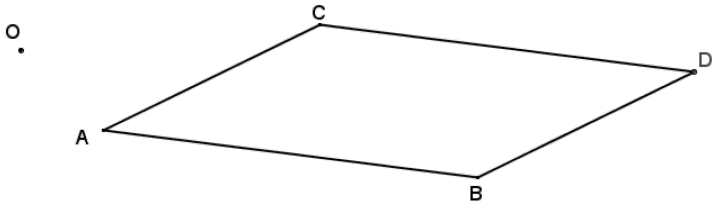
What would change if the center lies on center C? _____

What would change if r = 1?_____

☐ (9) compass, ruler

Dilation Practice

Draw the dilation of parallelogram ABCD from center O using the scale factor r = 2, and then answer the question that follows.



Is the image A'B'C'D' also a parallelogram? Explain

☐ (10) ruler, compass **Dilation Practice**

Only one of figures A, B, or C below contains a dilation that maps A to A' and B to B'. Explain for each figure why the dilation does or does not exist. For each figure, assume that AB ≠ A'B'.

a.

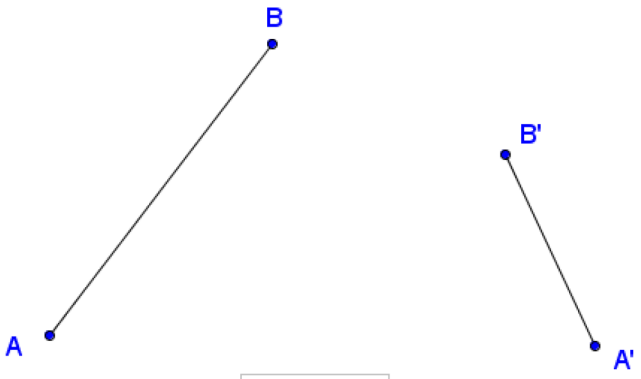
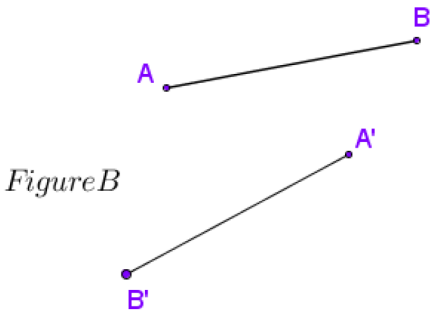


Figure A

b.



FigureB

c.

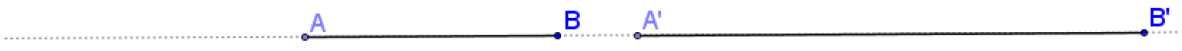
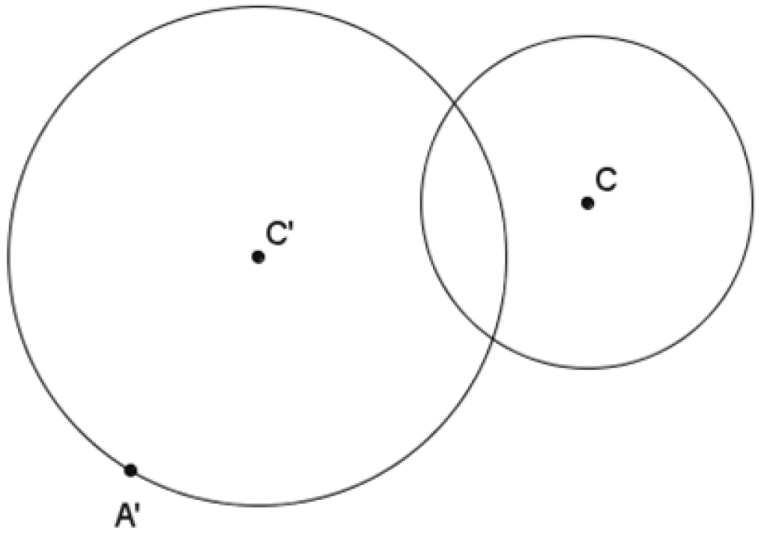


Figure C

☐ (11) **Dilation practice**

ruler, compass

In the picture below, the larger circle is a dilation of the smaller circle. Find the center of dilation O. (Use the parallel method to locate point A first – meaning, you know A'C' must be parallel to AC, so . . .)



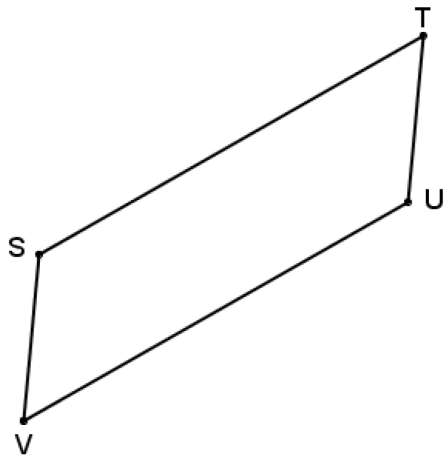
☐ (12) **Exit Ticket** (Trace the diagram onto your exit ticket paper and answer the questions)

ruler, compass

Dilate parallelogram $STUV$ from center O using a scale factor of $r = \frac{3}{\cdot}$.

How does $m\angle T'$ compare to $m\angle T$?

Using your diagram, prove your claim from Problem 2.

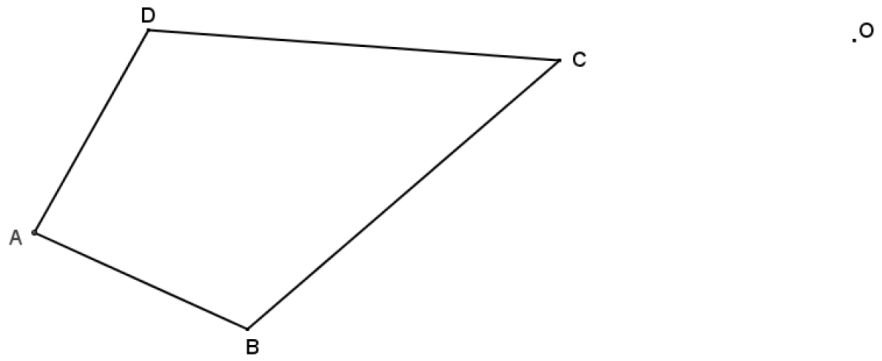


☐ (13) **Homework:**

ruler, compass

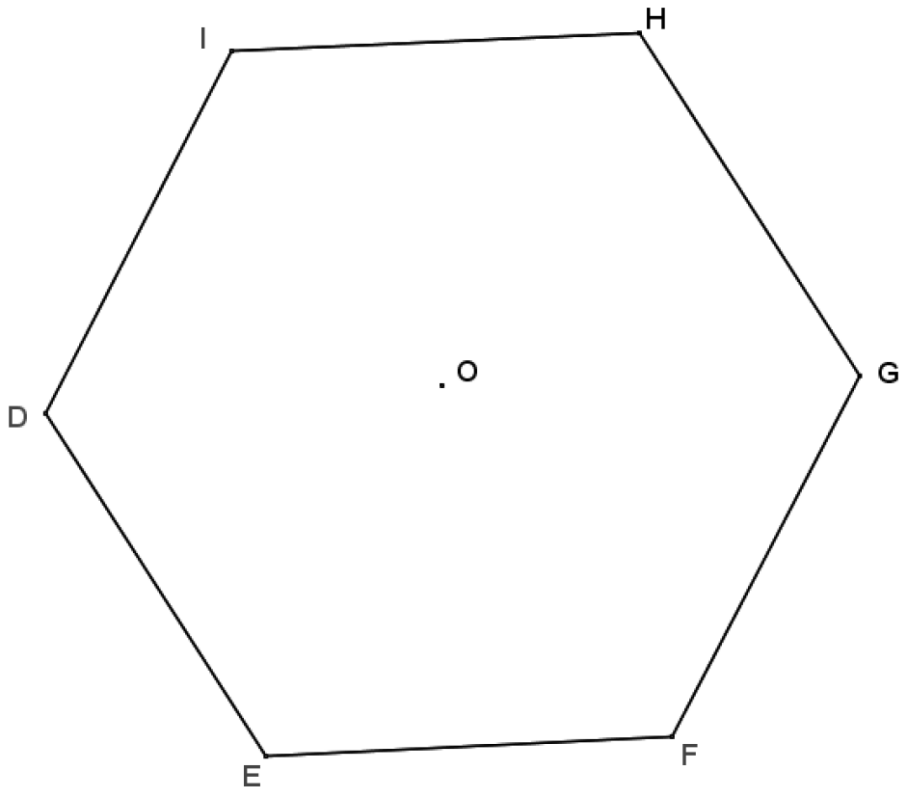
☐ (1) Dilate kite $ABCD$ from center O using a scale factor $r = 1\frac{1}{2}$.

Describe how the segments and angles of the original compare to those of the dilation.



☐ (2) Dilate hexagon $DEFGHI$ from center O using a scale factor of $r = \frac{1}{4}$.

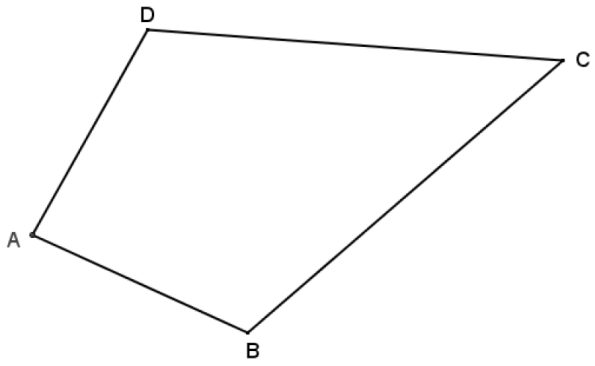
Describe how the segments and angles of the original compare to those of the dilation.



☐ (13) **Homework:**
cont.

☐ (3) Dilate kite $ABCD$ from center O using a scale factor $r = 1\frac{1}{2}$.

Describe how the segments and angles of the original compare to those of the dilation.



☐ (4) Read the lesson summary and draw sketches to illustrate the ideas.

Lesson Summary

- **Dilations map angles to angles of equal measure.**
- **Dilations map polygonal figures to polygonal figures whose angles are equal in measure to the corresponding angles of the original figure and whose side lengths are equal to the corresponding side lengths multiplied by the scale factor.**

Check after #4
Dilation of a segment summary

☐ (a) Given the dilation $D_{O,3/2}$, line segment PQ, and O is not on $\overleftrightarrow{PQ}$, what can we conclude about the image of $\overline{PQ}$?

☐ (b) Given figures A and B below, $\overline{BA} \parallel \overline{DC}$, $\overline{UV} \parallel \overline{XY}$, $\overline{UV} \cong \overline{XY}$, determine which figure has a dilation mapping the parallel line segments and locate the center of dilation O. For one of the figures, a dilation does not exist. Explain why.