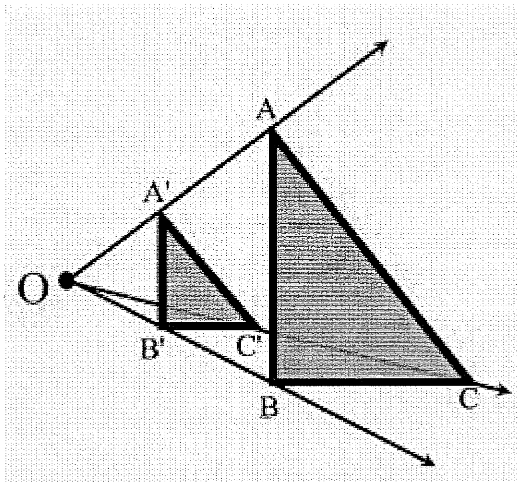
CCGPS Analytic Geometry **Dilations** **September 30, 2014 (Tues)**

A ________________ is a transformation (notation ____) that produces an image that is the ________________ as the original but it is a ____________. A dilation stretches or shrinks the original figure.



The description of a dilation includes the __________ (or ______________) and the __________________________.

The center of dilation is a fixed point about which all points are expanded or contracted. It is the only point that remains the same under a dilation.

A dilation of scalar factor k whose center of dilation is the ORIGIN is written:

$$D_k(x,y) = (kx, ky)$$

If the scale factor, k, is greater than 1, the image is an enlargement (a stretch)

If the scale factor, k, is between 0 and 1, the image is a reduction (a shrink)

What do you think happens when the scale factor is 1?

<u>Properties of Dilations:</u>

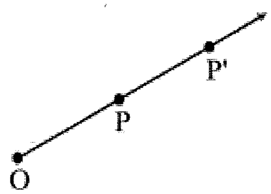
1. Angle measures remain the same
2. Parallel Lines remain parallel
3. points stay on the same lines
4. midpoint remains the same in each figure
5. orientation (lettering order remains the same)

However, distance is NOT preserved. (lengths of segments are not the same in all cases except a scale factor of 1.

DEFINITION: A **dilation** is a transformation of the plane, D_k, such that if O is a fixed point, k is a non-zero real number and P' is the image of point P, then O, P, and P' are collinear and $\frac{OP'}{OP} = k$.

Examples:

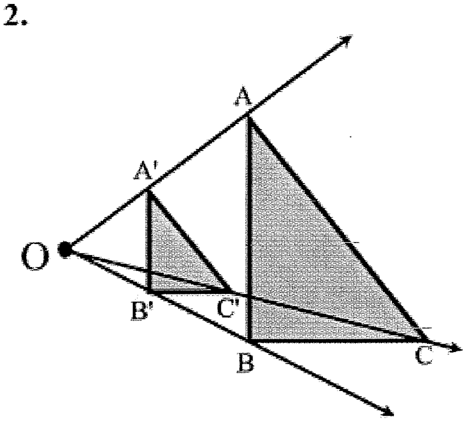
1.



P' is the image of *P* under a dilation about *O* of ratio 2.

$OP' = 2OP$ *and* $\frac{OP'}{OP} = 2$

2.



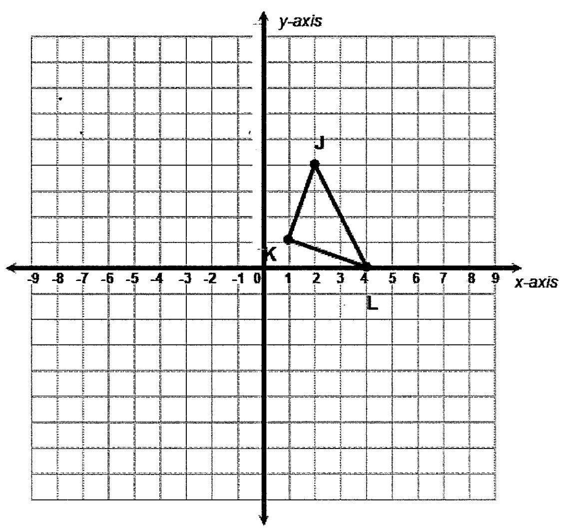
$\Delta A'B'C'$ is the image of ΔABC under a dilation about *O* of ratio $\frac{1}{2}$.

$OA' = \frac{1}{2}OA$

$OB' = \frac{1}{2}OB$

$OC' = \frac{1}{2}OC$

1.



Graph the dilated image of triangle JKL using a scale factor of 2 and (0,0) as the center of dilation.

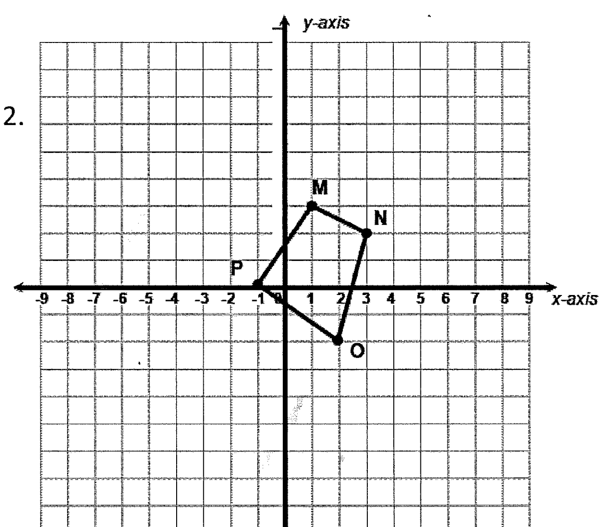
J: __________ J': __________

K: __________ K': __________

L: __________ L': __________

Graph a second dilated image of triangle JKL (in another color) using a scale factor of 2 and (-1,2) as the center of dilation.

2.



Graph the dilated image of quadrilateral MNOP using a scale factor of 3 and the origin as the center of dilation.

M: __________ M': __________

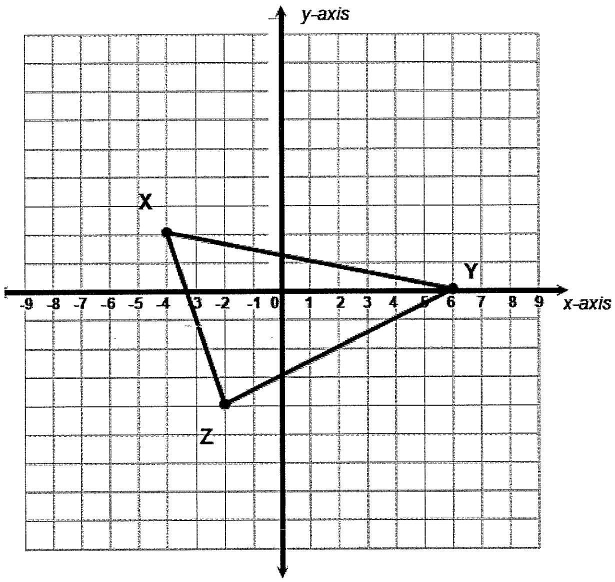
N: __________ N': __________

O: __________ O': __________

P: __________ P': __________

Graph a second dilated image of quadrilateral MNOP (in another color) using a scale factor of 3 and (1,1) as the center of dilation.

3.



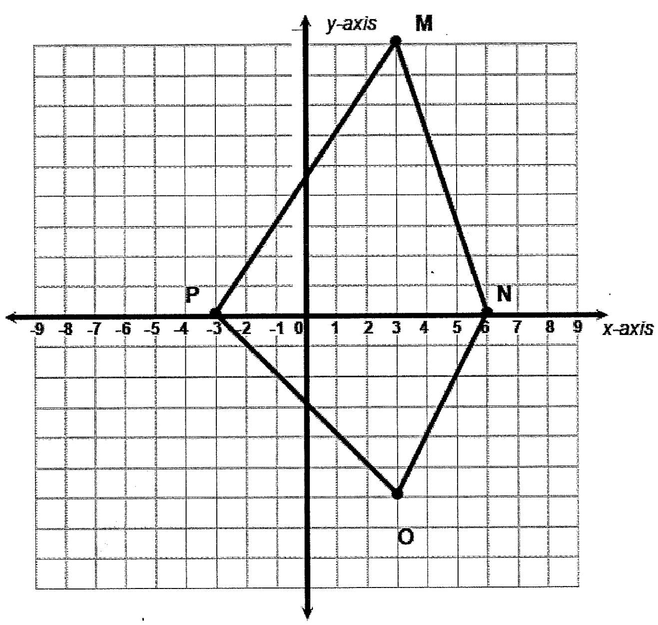
Graph the dilated image of triangle XYZ using a scale factor of 1.5 and (0,0) as the center of dilation.

X: __________ X': __________

Y: __________ Y': __________

Z: __________ Z': __________

4.



Graph the dilated image of quadrilateral MNOP using a scale factor of 1/3 and the origin as the center of dilation.

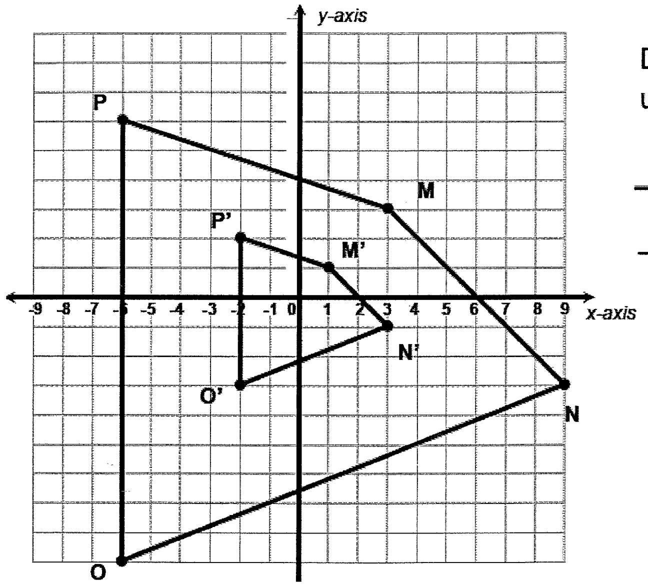
M: __________ M': __________

N: __________ N': __________

O: __________ O': __________

P: __________ P': __________

5.



Describe the dilation of quadrilateral MNOP, using the origin as the center.

____

____

6. The table below shows the coordinates of triangle RST and the coordinates of R′ in triangle R′S′T′. Triangle R′S′T′ is a dilation of triangle RST.

Triangle RST		Triangle R′S′T′	
R	(−2, −3)	R′	(−6, −9)
S	(0, 2)	S′	
T	(2, −3)	T′	

Name ______________________________ Date ______________ Period __________

CCGPS Analytic Geometry
Dilations

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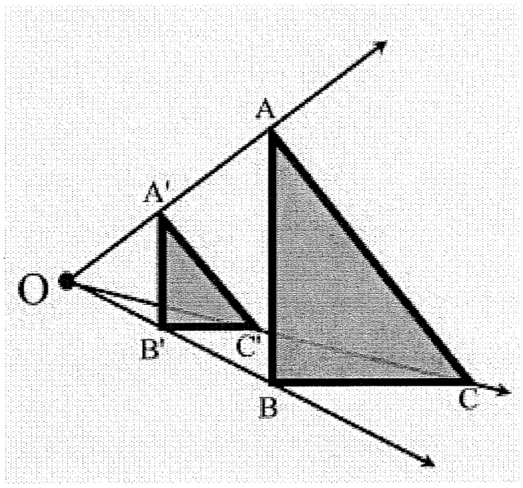

The description of a dilation includes the scale factor (or ratio) and the center of dilation. The center of dilation is a fixed point about which all points are expanded or contracted. It is the only point that remains the same under a dilation.

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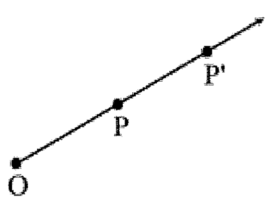

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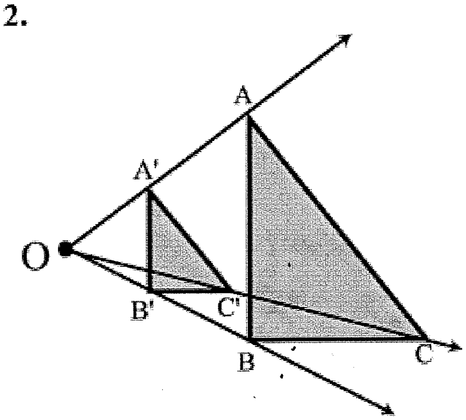

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