Name: ______________________________ Date: ____________________

UNIT 5 **REVIEW**

SIMILARITY REVIEW!

Pre-Image & Image Relationship	**Side Relationships**	
After a dilation($k \neq 1$) the two figures will be ________________. (congruent or similar?)	**Lengths** Image = k(pre-image) or Pre-image = $\frac{1}{k}$ (image)	**Parallel or Perpendicular** Image ______Pre-image ($\parallel$ or $\perp$?)

1. Which transformation below shows a dilation?

1) $(x, y) \rightarrow (y, x)$
2) $(x, y) \rightarrow (\frac{1}{2}x, \frac{1}{2}y)$
3) $(x, y) \rightarrow (x + 2.5, y - 4)$
4) $(x, y) \rightarrow (-x, y)$

2. If $\triangle DEF$ is dilated by a factor of 5, which of the following statements would be true?

(1) $m\angle D' = 5 \cdot m\angle D$

(2) $DE = \frac{1}{5}D'E'$

(3) $m\angle E = \frac{1}{5} \cdot m\angle E'$

(4) $EF = 5E'F'$

3. A three-inch line segment is dilated by a scale factor of 6 and centered off the segment. Which of the following statements is true of the image?

1) Length is 18 inches and is parallel to the original
2) Length is 18 inches and is perpendicular to the original
3) Length is 9 inches and is parallel to the original
4) Length is 9 inches and is perpendicular to the original

4. The image of $\triangle DEF$ is $\triangle D'E'F'$. Under which transformation will the triangles *not* be congruent?

1) a reflection through the origin

2) a reflection over the line $y = x$

3) a dilation with a scale factor of 1 centered at $(2, 3)$

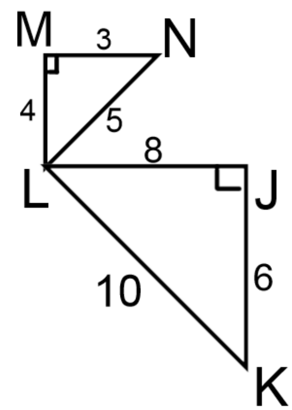
4) a dilation with a scale factor of $\frac{3}{2}$ centered at the origin

5. The coordinates of $\triangle ABC$ are $A(1, 1)$, $B(2, 3)$, and $C(3, 1)$. If $\triangle A'B'C'$ is the image of $\triangle ABC$ after a dilation centered at the origin with a scale factor of 2 followed by a reflection over the line y = x, then $\triangle A'B'C'$ is

1) an equilateral triangle
2) congruent to $\triangle ABC$
3) a right triangle
4) similar to $\triangle ABC$

Describing Transformations!			
Reflection needs • Line of Reflection	Rotation needs • Center • Angle • Direction	Translation needs • Distance • Direction	Dilation needs • Center • Scale Factor

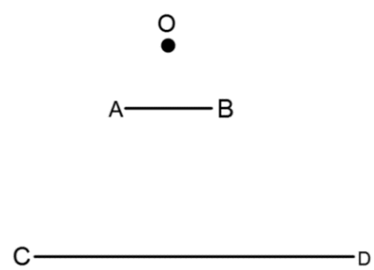
6. Which sequence of transformations will map ΔJKL onto ΔMNL ?



1) Rotation 90^o CCW around L, followed by a dilation scale factor of 2 centered at L.
2) Rotation 90^o CCW around L, followed by a dilation scale factor of $\frac{1}{2}$ centered at L.
3) Reflection over $\overline{LJ}$, followed by a dilation scale factor of 2 centered at L.
4) Rotation 180^o CCW around L, followed by a dilation scale factor of $\frac{1}{2}$ centered at L.

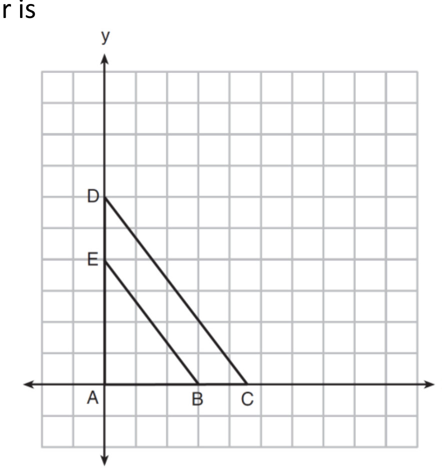
Scale Factor (k)
$k = \underline{\qquad}$

7. In the diagram below, $\overline{CD}$ is the image of $\overline{AB}$ after a dilation of scale factor *k* with center *O*. Which ratio is equal to the scale factor *k* of the dilation?



1) $\frac{OC}{OA}$
2) $\frac{BA}{OA}$
3) $\frac{OA}{BA}$
4) $\frac{OA}{OC}$

8. In the diagram below, $\triangle ABE$ is the image of $\triangle ACD$ after a dilation centered at the origin. The coordinates of the vertices are $A(0,0)$, $B(3,0)$, $C(4.5,0)$, $D(0,6)$, and $E(0,4)$. The scale factor is



1) $\frac{CD}{BA}$
2) $\frac{AE}{AD}$
3) $\frac{AD}{AE}$
4) $\frac{AD}{DC}$

Dilating Lines and Segments	
If CENTER ON THE LINE **Keep ____________ & ___ - ____________ the SAME.**	If CENTER OFF THE LINE **Keep the _______ the same.** (because image is parallel to pre-image) **Multiply the ___ - _____________ by the scale factor (k).**

9. Line ℓ is mapped onto line *m* by a dilation centered at the origin with a scale factor of 3. The equation of line ℓ is $2x - y = 8$. Determine and state an equation for line *m*.

10. Line $y = 3x - 1$ is transformed by a dilation with a scale factor of 2 and centered at $(3, 8)$. The line's image is

1) $y = 3x - 8$
2) $y = 3x - 4$
3) $y = 3x - 2$
4) $y = 3x - 1$

Ratio of Areas
Ratio Sides/Perimeters = $x : y$ Ratio Areas = ___ : ____

11. The sides of a triangle are 8, 12 and 15. The longest side of a similar triangle is 18. What is the ratio of the area of the smaller triangle to the area of the larger triangle?

a. 2:3
b. 4:9
c. 5:6
d. 25:36

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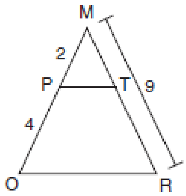
$\overline{PT} \parallel \overline{OR}$, find the length of MT.



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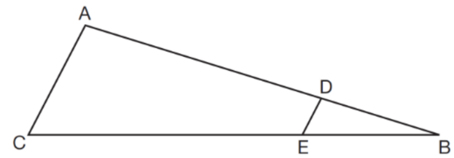
MUST USE SMALL TRIANGLE AND BIG TRIANGLE!

$\overline{AC} \parallel \overline{DE}$. If $AD = 24$, $DB = 12$, and $DE = 4$, what is the length of $\overline{AC}$?



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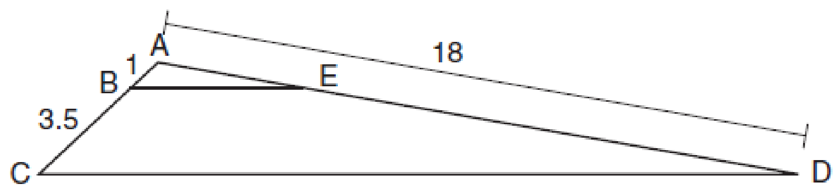
12. In the diagram below, triangle *ACD* has points *B* and *E* on sides $\overline{AC}$ and $\overline{AD}$, respectively, such that $\overline{BE} \parallel \overline{CD}$, $AB = 1$, $BC = 3.5$, and $AD = 18$. What is the length of $\overline{AE}$, to the *nearest tenth*?

1) 14.0

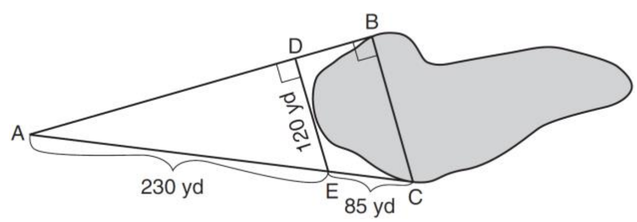
2) 5.1

3) 3.3

4) 4.0



13. To find the distance across a pond from point *B* to point *C*, a surveyor drew the diagram below. The measurements he made are indicated on his diagram. Use the surveyor's information to determine and state the distance from point *B* to point *C*, to the *nearest yard*.

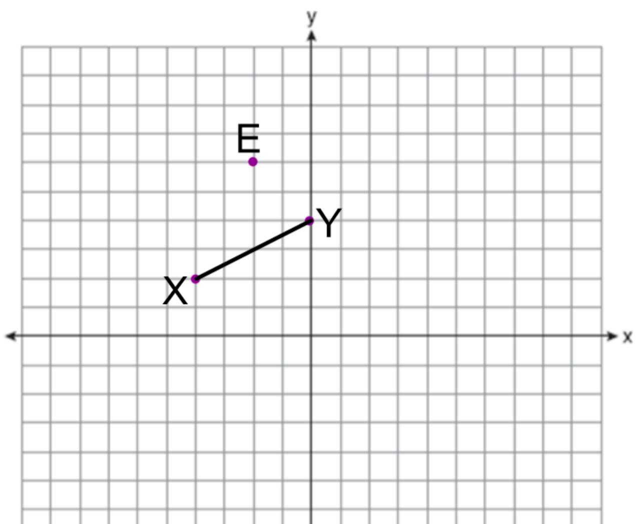


14. A tree casts a shadow 20 feet long. A vertical pole stands at a distance of 17 feet from the base of the tree, such that the end of the pole's shadow meets the end of the tree's shadow. If the pole is 5 feet tall, determine and state the height of the tree to the *nearest tenth of a foot*.

Dilating on a graph by center not at the origin

Count boxes (like slope) from ___________ of dilation to one vertex, repeat same distances in same direction for dilation of 2! (continue to repeat again for dilation 3)
OR! Use a compass and straight edge!

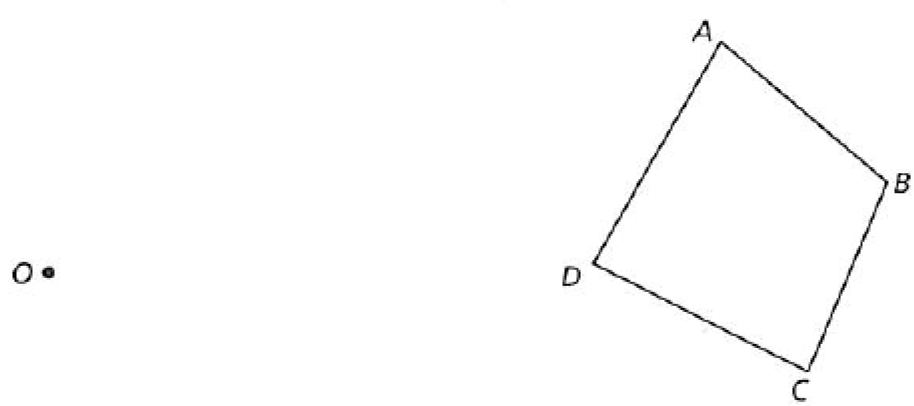
15. On the graph below, point $E(-2,6)$ and $\overline{XY}$ with coordinates $X(-4,2)$ and $Y(0,4)$ are graphed. What are the coordinates of X' and Y' after $\overline{XY}$ undergoes a dilation centered at point *E* with a scale factor of 2?



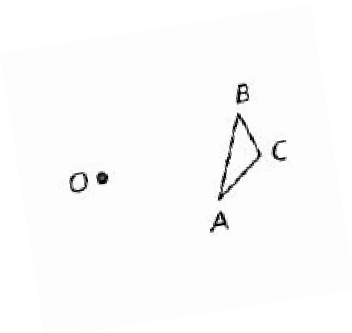
Constructing Dilations

- Use your compass to measure the distance between the center of dilation and a vertex. Expand the width indicated by the scale factor.
- If the scale factor is $\frac{1}{2}$, make a ___________________________________

16. Use a compass and a straightedge to construct the image of the figure after a dilation with center O and the given scale factor. Label the vertices of the image. Scale factor: $\frac{1}{2}$

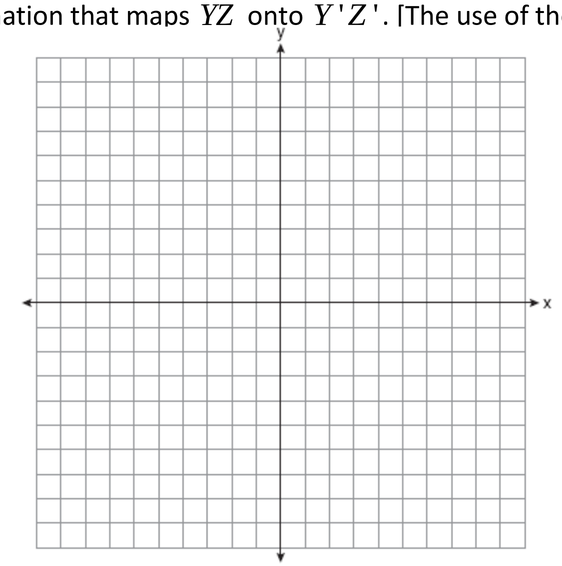


17. Use a compass and a straightedge to construct the image of the figure after a dilation with center O and the given scale factor. Label the vertices of the image. Scale factor: 4

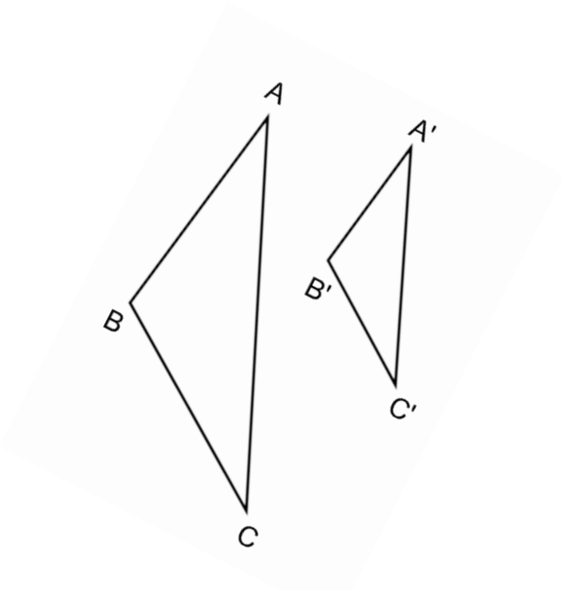


To find Center of Dilation	To Find Scale Factor
Connect _________ to _____________ (and PAST small) for 2 pairs of corresponding points.	$k = \frac{}{}$ (count lengths using only vertical/horizontal segments)

18. The coordinates of the endpoints of $\overline{YZ}$ are $Y(4,2)$ and $Z(-8,2)$. The coordinates of endpoints $\overline{Y'Z'}$ are $Y'(2,1)$ and $Z'(-4,1)$. Precisely describe the SINGLE transformation that maps $\overline{YZ}$ onto $\overline{Y'Z'}$. [The use of the set of axes below is optional.]



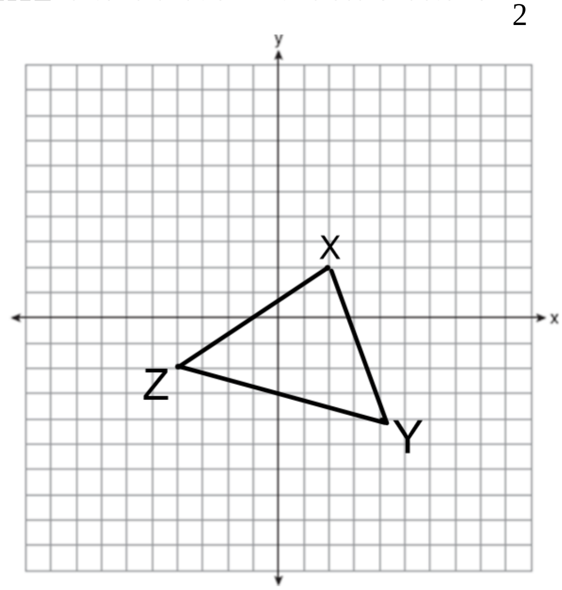
19. Locate the center of dilation that maps ΔABC to $\Delta A'B'C'$ and label it *O*.



To Dilate Centered at the Origin	In Similar Figures
Multiply each coordinate by the ____________ _________________(k).	Corresponding sides are ____ _________________. Corresponding angles are ________.

20. Triangle *XYZ* is graphed on the set of axes below.

a) On the same set of axes, graph and label $\Delta X'Y'Z'$, the image of ΔXYZ after a dilation with a scale factor of $\frac{5}{2}$ centered at the origin.

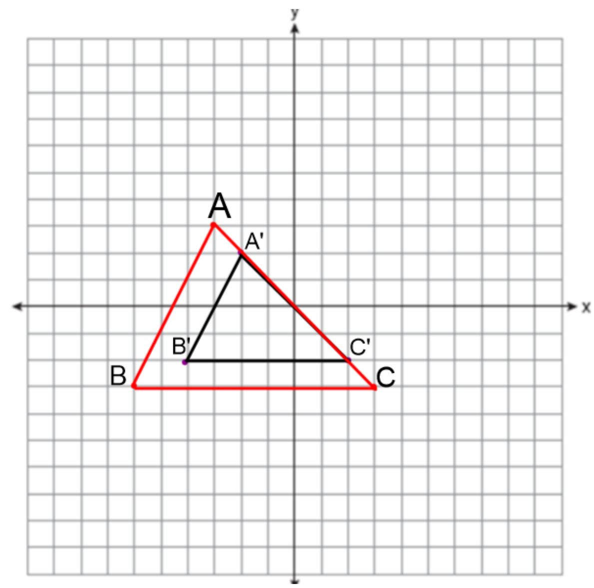


b) What is the relationship between the measure of $\angle X'Y'Z'$ and the measure of $\angle XYZ$?

Describing Dilations	Finding Slope
Dilation needs • Center • Scale Factor	$\dfrac{rise}{run}$

21. In the diagram below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a SINGLE transformation.

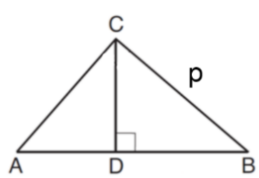
a) Precisely describe the single transformation that was performed.



b) Use slopes to explain why $\overline{A'B'} \parallel \overline{AB}$?

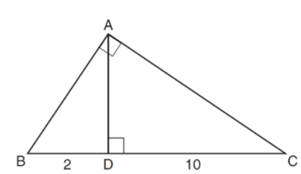
HLLS	SAAS
$\dfrac{Hypotenuse}{Leg} = \dfrac{Leg}{Hypotenuse}$ *USE THIS IF THE ALTITUDE IS **NOT** LABELED!*	$\dfrac{Side_1}{Altitude} = \dfrac{Altitude}{Side_2}$ *USE THIS IF THE ALTITUDE IS LABELED!*

22. In the diagram below of triangle *ABC*, $\overline{CD}$ is the altitude to $\overline{AB}$, $CB = p$, AD = 5, and DB = 6. What value of p will make ΔABC a right triangle with a right angle at $\angle ACB$?

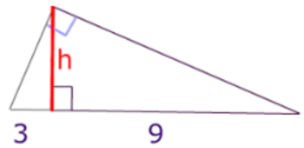


23. Triangle *ABC* shown below is a right triangle with $\overline{AD}$ drawn to the hypotenuse $\overline{BC}$. If $BD = 2$ and $DC = 10$, what is the length of $\overline{AD}$ that makes $\overline{AD} \perp \overline{BC}$?

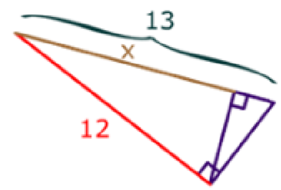
1) $2\sqrt{2}$
2) $2\sqrt{5}$
3) $2\sqrt{6}$
4) $2\sqrt{30}$



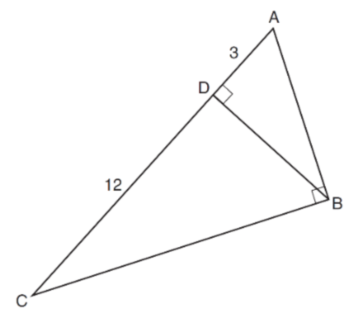
24. Find h:



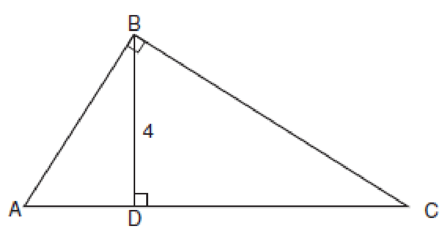
25. Find x:



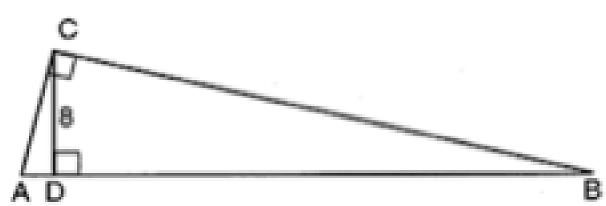
26. In right triangle *ABC* shown in the diagram below, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$, $CD = 12$, and $AD = 3$. What is the length of $\overline{AB}$? Leave your answer in simplest radical form.



27. The drawing for a right triangular roof truss, represented by ΔABC, is shown in the accompanying diagram. If $\angle ABC$ is a right angle, altitude $BD = 4$ meters, and $\overline{DC}$ is 6 meters longer than $\overline{AD}$, find the length of base $\overline{AC}$ in meters.



28. In the accompanying diagram, the altitude to the hypotenuse of right triangle ABC is 8. The altitude divides the hypotenuse into segments whose measures may be:



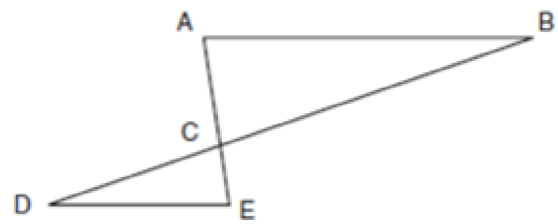
1) 8 and 12
2) 3 and 24
3) 6 and 10
4) 2 and 32

Similarity Proofs

	PROVE STATEMENT	REASON
1.	**Similarity Statement** $\Delta ABC \sim \Delta DEF$	$AA \cong AA$
2.	**Proportion** $\frac{AB}{BC} = \frac{DE}{EF}$	Corresponding parts of similar triangles are in proportion.
3.	**Product** $BCxDE = ABxEF$	The product of the means equals the product of the extremes

29. Given: $\overline{AE}$ and $\overline{DB}$ intersect at C
$\overline{AB} \parallel \overline{DE}$

Prove: $BC \cdot ED = AB \cdot DC$



STATEMENT	REASON