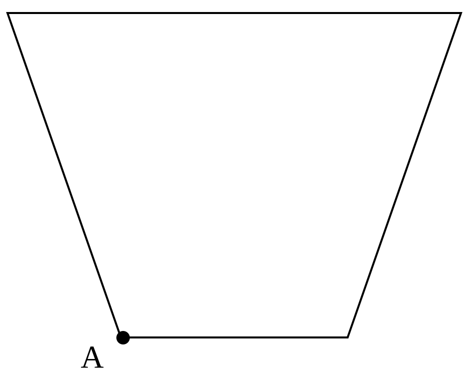
Name: ________________________ Section:_____________________ Date:__________

Geometry: Unit 7 Review (2016-17): Similarity

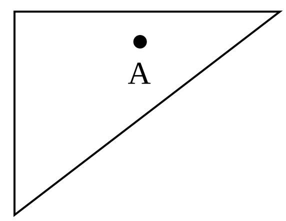
1. Write 3 statements that are equivalent to $\frac{a}{b}=\frac{c}{d}$

2. Construct each of the dilations:

a) $D_{A,\frac{1}{2}}$

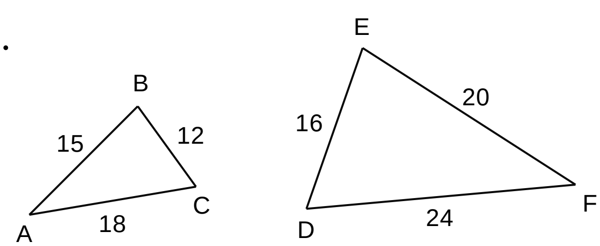


b) $D_{A,2}$

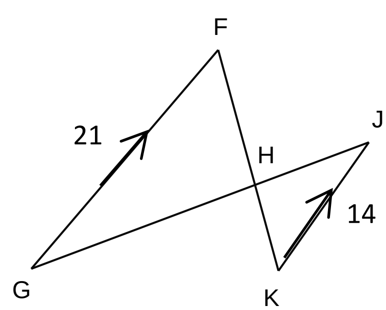


For 3-6, Determine whether the figures are similar. If the figures are similar, write the statement of similarity and the ratio of similarity.

3.



4.



Similar? Yes No

If so, why (AA~,SSS~,SAS~)?____________

Statement of Similarity: $\Delta ABC \sim$ ______

Ratio of Similarity: ____________

Scale Factor: ____________

Similar? Yes No

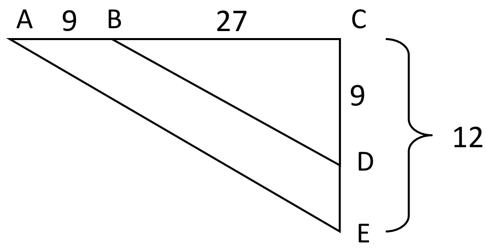
If so, why (AA~,SSS~,SAS~)?____________

Statement of Similarity: $\Delta FGH \sim$ ______

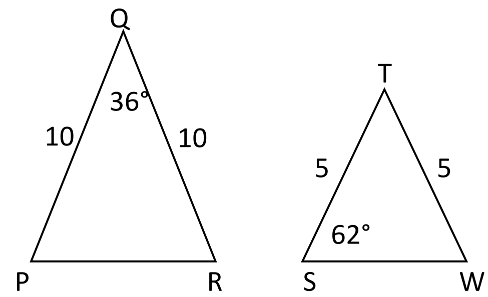
Ratio of Similarity: ____________

Scale Factor: ____________

5.



6.

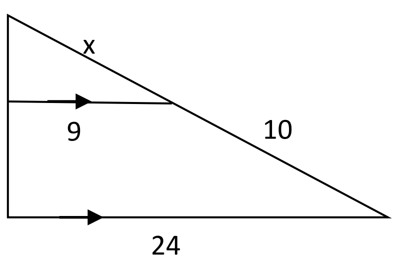


Similar? Yes No
If so, why (AA~,SSS~,SAS~)?______________
Statement of Similarity: $\Delta BCD \sim$ _______
Ratio of Similarity: ______________
Scale Factor: ______________

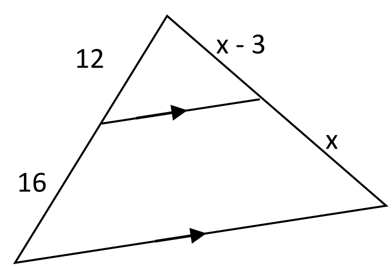
Similar? Yes No
If so, why (AA~,SSS~,SAS~)?______________
Statement of Similarity: $\Delta PQR \sim$ _______
Ratio of Similarity: ______________
Scale Factor: ______________

For 7, find the value of x.

7. a.



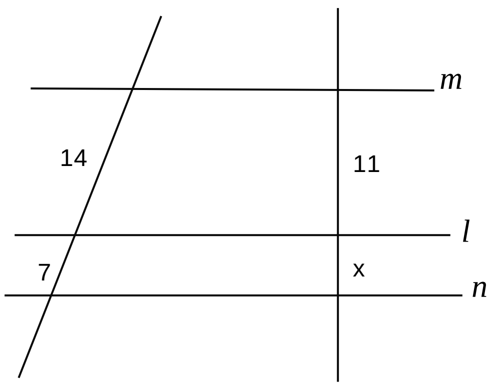
b.



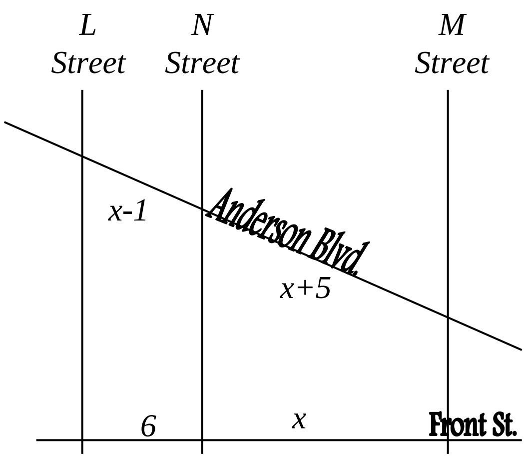
c. For which question could you use side splitter (if you want to)? _______

For 8 and 9, Determine the value of x that makes the lines *m*,*l* and *n* parallel. Only an algebraic solution will be accepted. Show all work.

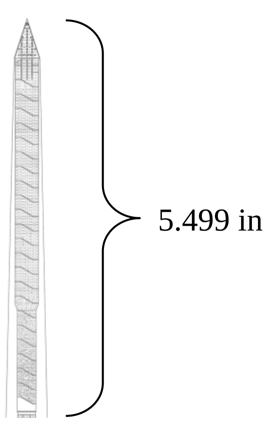
8.



9.



10. In 1884, the Washington Monument was completed, more than 30 years after it was begun. At the time it was the tallest structure in the world. The scale drawing of the Washington Monument shown below is drawn so that 1 inch=101 feet. How tall is the Washington Monument to the nearest foot?

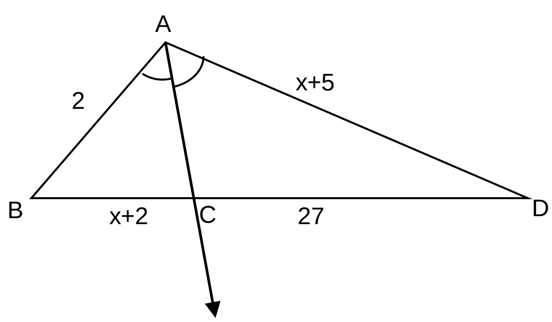


11. Two triangles are similar to each other with a similarity ratio of 3:5. The smaller triangle has a perimeter of 21 inches and an area of 36 in^2. What is the perimeter and area of the larger triangle?

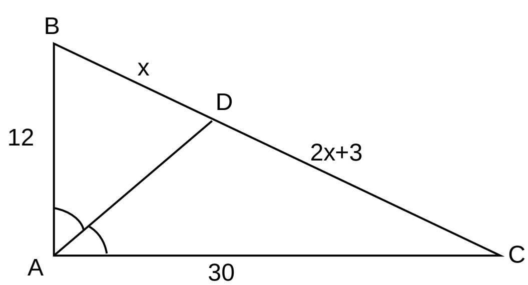
12. $\Delta RST \sim \Delta UVW$. If the area of ΔRST is 48ft^2 and the the area of ΔUVW is 75 ft^2, determine the similarity ratio *(make sure it corresponds with the similarity statement)*.

For 13 and 14, Find BD.

13.

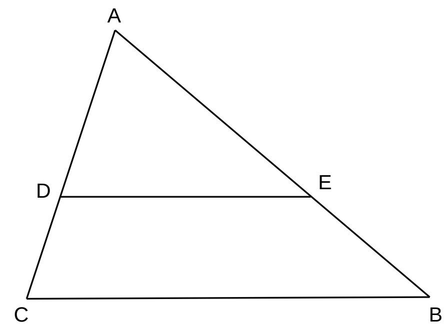


14.



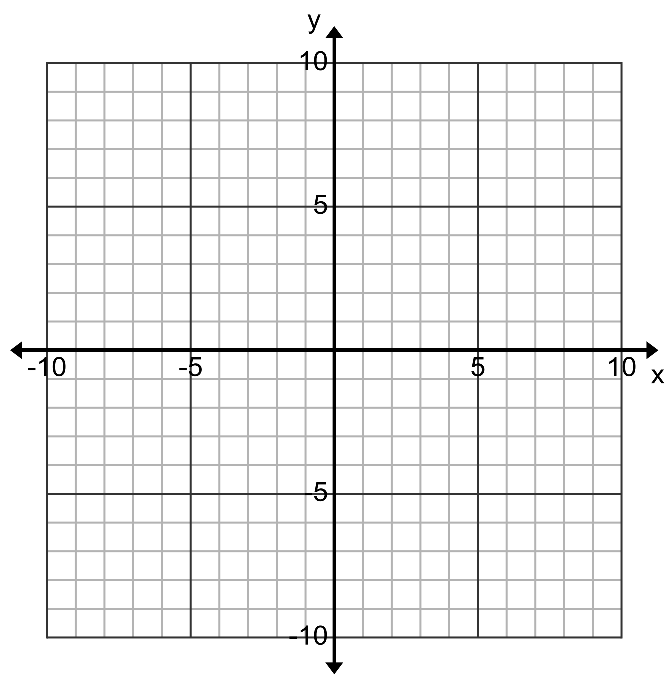
15. Given: Triangle ABC with $\overline{DE} \parallel \overline{CB}$

Prove: $AD \bullet CB = AC \bullet DE$



16. Given: A(0, 0), B(6, 2), C(6, 6), D(9, 3), E(9, 9)

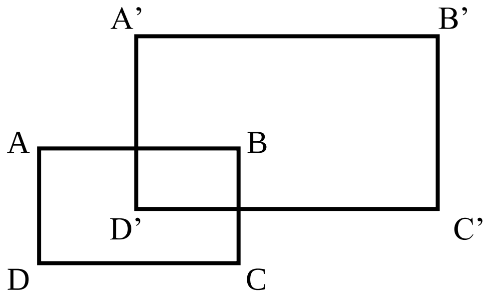
Prove: $\Delta ABC \sim \Delta ADE$ using coordinate geometry



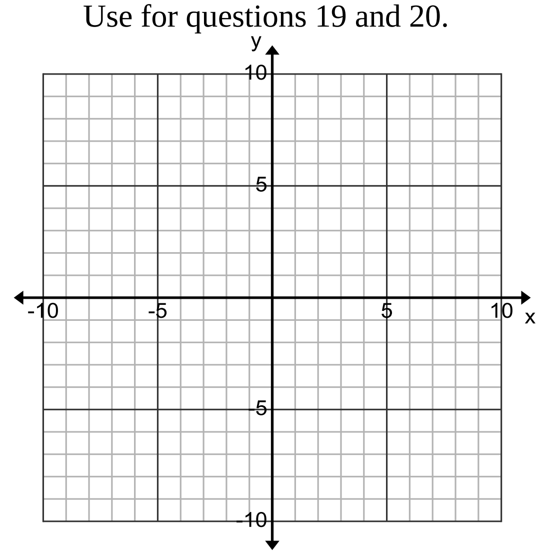
17. Dilations preserve all of the following properties except: (circle your answer)

a. Parallelism b. Perpendicularity c. Angle Measure d. Distance e. Orientation

18. Find the value of the scale factor as a ratio used to dilate rectangle ABCD.



Use for questions 19 and 20.

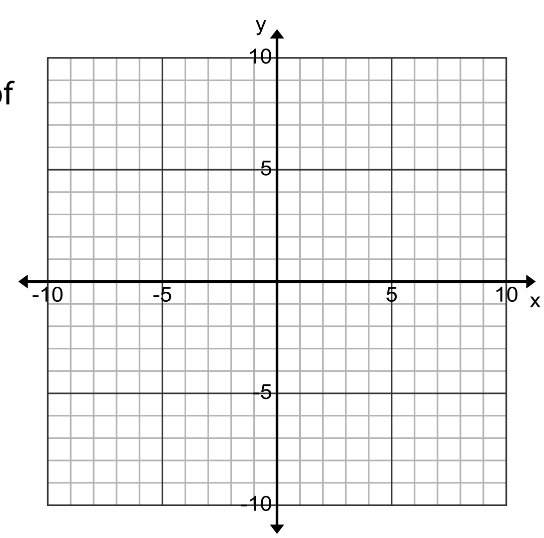


19. If the coordinates of point A are $(-2,3)$, what is the image of A under $r_{y-axis}(D_{origin,3})$? (Use of the grid is optional)

1) $(-6,-9)$
2) $(9,-6)$
3) $(5,6)$
4) $(6,9)$

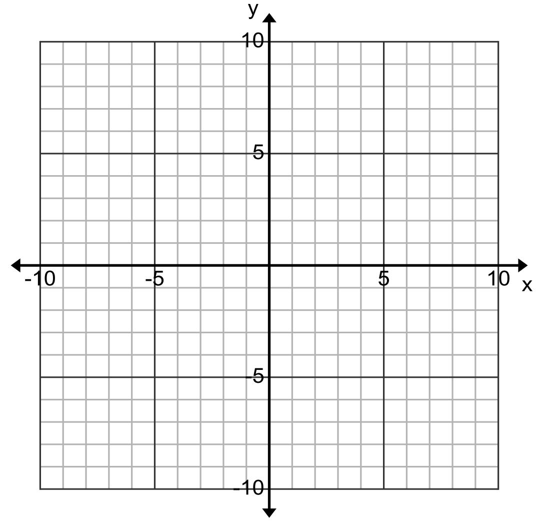
20. Dilate point C(6,-1) from the point (10,0) by a scale factor of 5. State the coordinates.

21. Given the points T(-4,-1) and U(10,6) on directed line segment $\overline{TU}$, find point Q that divides $\overline{TU}$ into the ratio of 2 to 5. (Use of the grid is optional).



22.

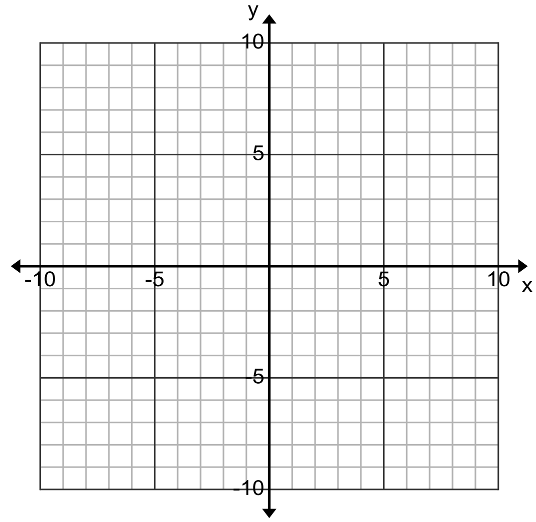
22. Given line h with the equation $5x + y = 8$ maps onto line j after a dilation centered at the origin by a scale factor of ½,answer the following:



a. Write an equation for line j.

b. Determine the relationship between lines h and j. ______________________________

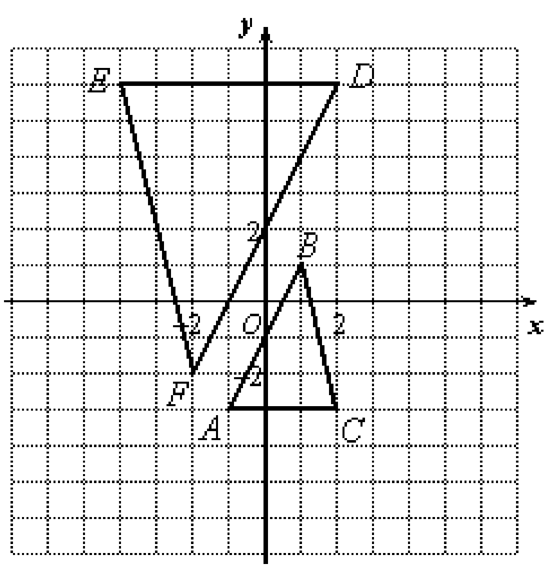
23. Given line f with the equation $y = \frac{1}{3}x$ maps onto line g after a dilation centered at the origin by a scale factor of 3,answer the following:



a. Write an equation for line g.

b. Determine the relationship between lines f and g. ________________________

24. Identify a precise sequence of transformations that maps ΔDFE onto ΔABC.



GEO Unit 7 Review ANSWERS 2016-17

1. $bc = ad$, $\frac{b}{d} = \frac{a}{c}$, $\frac{b}{a} = \frac{d}{c}$, $\frac{c}{a} = \frac{d}{b}$

2. Constructions

3. Yes, they are similar by $SSS\sim$
$\Delta ABC \sim \Delta FED$
Sim Ratio: ¾ Scale Factor: 4/3

4. Yes, they are similar by $AA\sim$
$\Delta FGH \sim \Delta KJH$
Sim Ratio: 3/2 Scale Factor 2/3

5. Yes, they are similar by $SAS\sim$
$\Delta BCD \sim \Delta ACE$
Sim Ratio: ¾ Scale Factor 4/3

6. No, they are not similar (the included angles are not congruent)

7. A. $x = 6$ (similar triangles) B. $x = 12$ C. Only B

8. $x = 5.5$

9. $x = 10$ (reject $x = -3$)

10. $\approx 555\ ft$

11. $P = 35\ in$; $A = 100\ in^2$

12. $\frac{4}{5}$ or 4:5

13. $BD = 33$

14. $BD = 6$

15.

Statements	Reasons
1. $\overline{DE} \parallel \overline{CB}$	1. given
2. $\measuredangle ADE \cong \measuredangle ACB$, $\measuredangle AED \cong \measuredangle ABC$	2. ∥ lines → ≅ corresponding $\measuredangle s$
3. $\Delta ADE \cong \Delta ACB$	3. AA~AA (steps 2,2)
4. $\frac{AD}{AC} = \frac{DE}{CB}$	4. $\sim\Delta s$ → ≅ $\measuredangle s$ and proportional sides
5. $AD \cdot CB = AC \cdot DE$	5. cross products property

Note: could also use AA~ with one set as reflexive

16. **Method 1**
$m_{BC} = undefined = m_{ED}$

Since slopes of $\overline{BC}$ and $\overline{ED}$ are both undefined, they are both vertical and therefore parallel. Since they are parallel lines cut by a transversal, then corresponding angles are congruent, so $\measuredangle ABC \cong \measuredangle ADE$ and $\measuredangle ACB \cong \measuredangle AED$. Therefore $\Delta ABC \sim \Delta ADE$ by AA~.

Method 2

$AB = 2\sqrt{10}$ $AC = 6\sqrt{2}$ $BC = 4$
$AD = 3\sqrt{10}$ $AE = 9\sqrt{2}$ $DE = 6$

$\frac{AB}{AD} = \frac{2\sqrt{10}}{3\sqrt{10}}$ $\frac{AC}{AE} = \frac{6\sqrt{2}}{9\sqrt{2}}$ $\frac{BC}{DE} = \frac{4}{6}$

$\frac{AB}{AD} = \frac{2}{3} = \frac{AC}{AE} = \frac{BC}{DE}$

Since all 3 set of corresponding sides have the same similarity ratio of $\frac{2}{3}$, then they are proportional. Therefore $\Delta ABC \sim \Delta ADE$ by SSS~.

Method 3: Use the same calculations as method 2

Since $\frac{AB}{AD} = \frac{2}{3} = \frac{AC}{AE}$ have the same similarity ratio, then they are proportional.

Since the included angle $\measuredangle A \cong \measuredangle A$ by reflexive, then $\Delta ABC \sim \Delta ADE$ by SAS~.

17. d. Distance is not preserved under a dilation

18. $\frac{A'B'}{AB} = k$ Scale Factor = $\frac{3}{2}$

Transformation:
$D_{\frac{3}{2}}(ABCD)$

19. 4) A'(6,9)

20. C'(-10,-5)

21. Q(0,1)

22. j: $y = -5x + 4$
h & j are parallel

23. g: $y = \frac{1}{3}x$
f & g are coincident

25. Example: 1) First dilate ΔDFE by a scale factor of ½ centered at D to map D→D, F→F', E→E'.
2) Translate down 9 and left 3 <-3,-9> to map D→A, F'→F", E'→E".
3) Reflect into point A or rotate 180° around A to map A→A, F"→B, E"→C.