

## Geometry Unit 6 Review Similarity

1. Compare and contrast similar triangles with congruent triangles.

Similar  $\Delta$ 's have  $\cong$  corresponding  $\angle$ 's and proportional sides. Congruent  $\Delta$ 's have  $\cong$  corresponding  $\angle$ 's and  $\cong$  corresponding sides.

2. How does the ratio of corresponding sides compare to the ratio of perimeters for two similar triangles? The ratios are =.

3. How does the ratio of corresponding sides compare to the ratio of areas for two similar triangles? (similarity ratio)<sup>2</sup> = Area ratio

4. How does the ratio of corresponding sides compare to the ratio of volumes for two similar figures? (similarity ratio)<sup>3</sup> = volume ratio

5. The perimeter of rectangle WXYZ is 70 inches. The perimeter of rectangle of ABCD is 90 inches. What is the ratio of the area of rectangle ABCD to WXYZ?

perimeter ratio =

similarity ratio =  $\frac{90}{70} = \frac{9}{7}$  so area ratio =  $(\frac{9}{7})^2 = \frac{81}{49}$

6. Are all equilateral triangles similar? Are they all congruent?

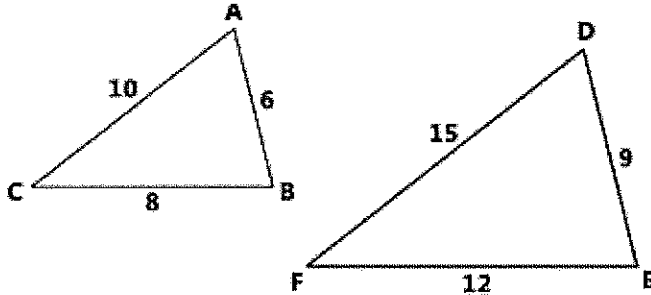
Yes by AAA b/c they all have 60°  $\angle$ 's.

no, could have different sides.

7. Are all isosceles triangles similar? Are they all congruent?

No, they do not have to have =  $\angle$ 's so they are not similar. They could have different sides so they are not  $\cong$ .

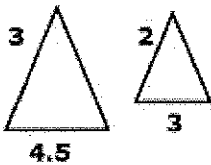
8. Find the ratio of the perimeters of the shapes.



similarity ratio = perimeter ratio.

$$\frac{9}{6} = \frac{3}{2}$$

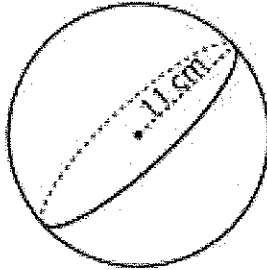
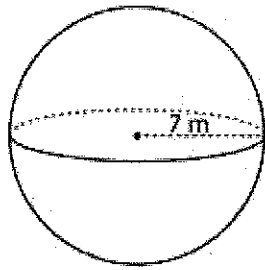
9. Find the ratio of the areas of the shapes.



$\frac{2}{3}$  = similarity ratio

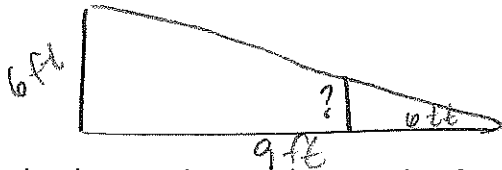
(similarity ratio)<sup>2</sup> = area ratio  
 $= (\frac{2}{3})^2 = \frac{4}{9}$

10. Find the ratio of the volume of the shapes.



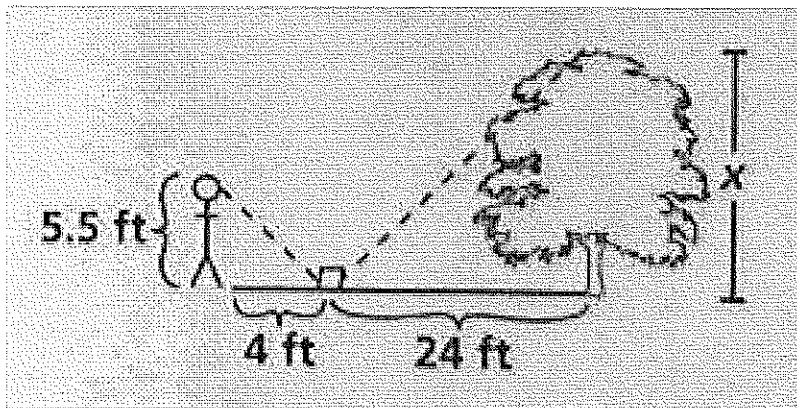
$\frac{11}{7} = \text{similarity ratio}$   
 $(\text{similarity ratio})^3 = \text{volume ratio}$   
 $= \frac{11^3}{7^3} =$   
 $= \frac{1331}{343}$

11. A 6 ft tall tent standing next to a cardboard box casts a 9 ft shadow. If the cardboard box casts a shadow that is 6 ft long then how tall is it?



$\frac{6}{x} = \frac{9}{6}$   
 $9x = 36$   
 $x = 4 \text{ ft}$

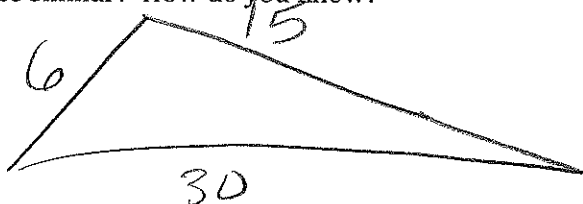
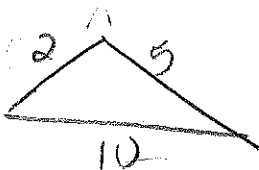
12. Natasha places a mirror on the ground 24 feet from the base of an oak tree. She walks backward until she can see the top of the tree in the middle of the mirror. At that point, Natasha's eyes are 5.5 ft above the ground, and her feet are 4 feet from the image in the mirror. Find the height of the oak tree.



$\frac{x}{5.5} = \frac{24}{4}$   
 $4x = 132$   
 $x = 33 \text{ feet}$

13.  $\triangle PIG \sim \triangle COW$  then  $\frac{IG}{GP} = ?$   $\frac{OW}{WC}$

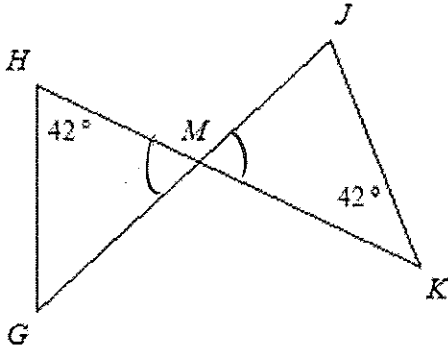
14. One triangle has side lengths of 2, 5, 10 and another triangle has sides of lengths of lengths 6, 15, and 30. Are the triangles similar? How do you know?



$\frac{6}{2} = 3$   
 $\frac{15}{5} = 3$   
 $\frac{30}{10} = 3$   
 yes by SSS all ratios are =

15.  $GO \cdot ON = DO \cdot IT$ , then  $\frac{GO}{DO} = ? \frac{IT}{ON}$

16. Are the triangles similar? How do you know?



yes by AA ~  
the vertical  $\angle$ s  
are ~ and  $\angle H \cong \angle K$ .

17.  $\frac{4}{9} = \frac{12}{x}$

$4x = 108$   
 $x = 27$

18. If the volume of one cube is 1000 cubic meters and the ratio of volumes between this cube and a second cube is  $\frac{8}{27}$  what is the volume of the second package? What is the length of a side of the second cube?

$\frac{1000}{x} = \frac{8}{27}$

$8x = 27000$

$x = 3375$  - volume of 2nd cube.

side of second cube  
 $x^3 = 3375$   
 $x = 15$

19. If the volume of one cube is 1728 cubic meters and the ratio of volumes between this cube and a second cube is  $\frac{216}{1331}$  what is the volume of the second package? What is the length of a side of the second cube?

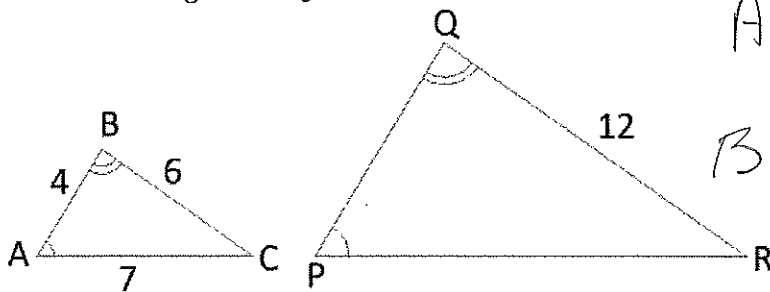
$\frac{1728}{x} = \frac{216}{1331}$

$216x = 2299968$

$x = 10648$  - volume of 2nd cube

side of second cube  
 $x^3 = 10648$   
 $x = 22$

20. A. What scale factor can be used for finding missing side lengths in the triangles below?



A.  $\frac{12}{6} = 2$

B.  $PQ = 8$   
 $\frac{PQ}{4} = \frac{12}{6}$

$6PQ = 48$

$PQ = 8$

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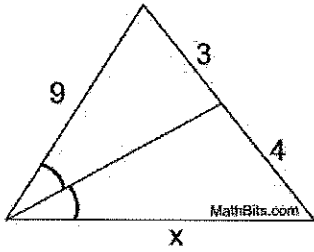
$PR = 14$

$\frac{PR}{7} = \frac{12}{6}$

$6PR = 84$

$PR = 14$

21. Find x.

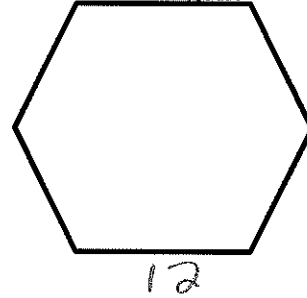
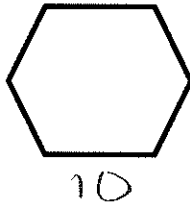


$$\frac{3}{9} = \frac{4}{x}$$

$$30 = 3x$$

$$12 = x$$

22. These similar hexagons are not regular polygons. The length of a side of the shorter hexagon is 10 and the length of the side of the larger hexagon is 12. If the perimeter of the larger hexagon is 58 what is the perimeter of the smaller hexagon?

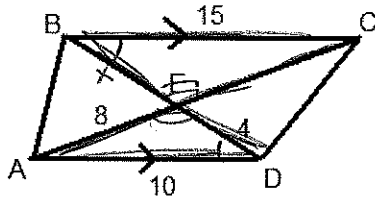


$$\frac{12}{10} = \frac{58}{x}$$

$$12x = 580$$

$$x = 48.\bar{3}$$

23. Find BE

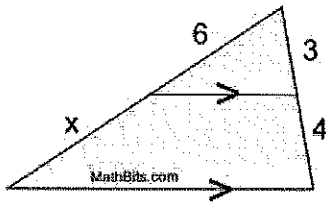


$$\frac{x}{4} = \frac{15}{10}$$

$$10x = 60$$

$$x = 6$$

24. Solve for x.

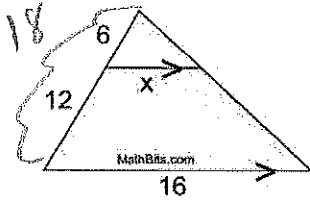


$$\frac{6}{3} = \frac{x}{4}$$

$$24 = 3x$$

$$8 = x$$

25. Solve for x.

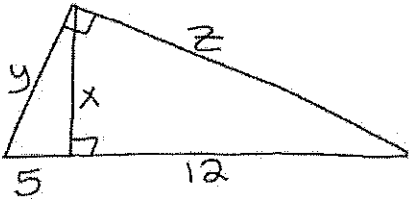


$$\frac{18}{6} = \frac{16}{x}$$

$$18x = 96$$

$$x = 5.\bar{3}$$

26. Find x, y, and z. Use exact answers.

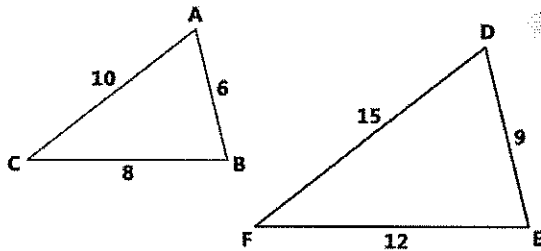


$$x = \sqrt{5 \cdot 12} = \sqrt{60} = \sqrt{4 \cdot 15} = 2\sqrt{15}$$

$$y = \sqrt{5 \cdot 17} = \sqrt{85}$$

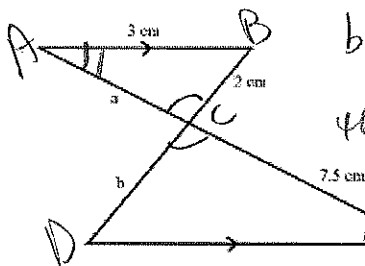
$$z = \sqrt{12 \cdot 17} = \sqrt{204} = \sqrt{4 \cdot 51} = 2\sqrt{51}$$

27. Are the triangles similar? If so, write a similarity statement and name the postulate or theorem that supports your answer. Also, label the drawing and/or show work to support your answer. If the triangles are not similar, explain why.

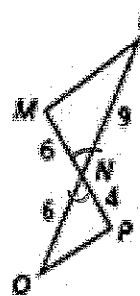


a.)  $\triangle ABC \sim \triangle DEF$  by SSS  
 $\frac{9}{6} = \frac{12}{8} = \frac{15}{10} = \frac{3}{2}$  = scale factor of all 3 pairs of sides

a.



b.)  $\triangle EDC \sim \triangle ABC$  by AA  
 the vertical  $\angle$  same and  $\angle A \cong \angle E$  by alt. int.  $\angle$ s.

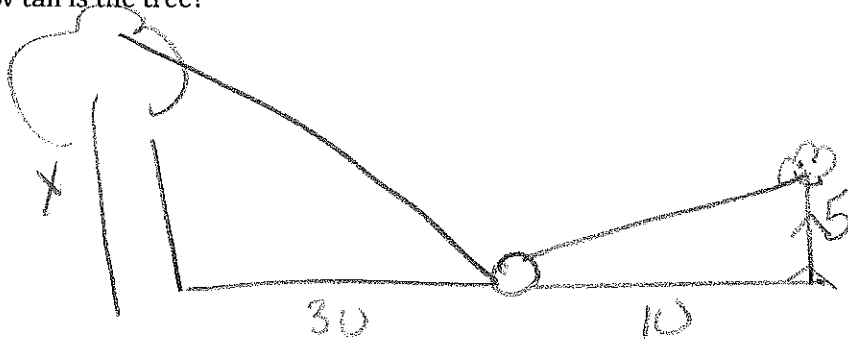


c.  $\triangle MNP \sim \triangle QNP$  by SAS  
 the vertical  $\angle$ s are  $\cong$  and  $\frac{9}{6} = \frac{6}{4} = \frac{3}{2}$  so scale factor is  $\frac{3}{2}$ .

b.

c.

28. Alice places a mirror 30 feet from the base of a tree. When she stands 10 feet from the mirror she can see the top of the tree in the mirror. If her eyes are 5 ft above the ground, how tall is the tree?



$$\frac{x}{5} = \frac{30}{10}$$

$$10x = 150$$

$$x = 15 \text{ feet}$$

circle letters