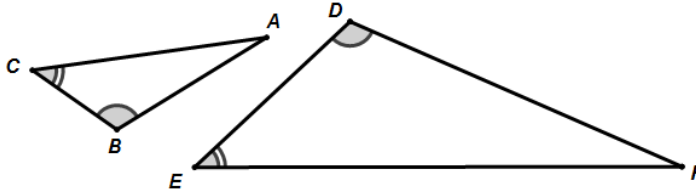


Two figures are considered to be **SIMILAR** if the two figures have the same shape but may differ in size. To be similar by definition, all corresponding sides have the same ratio OR all corresponding angles are congruent. Alternately, if one figure can be considered a transformation (*rotating, reflection, translation, or dilation*) of the other then they are also similar.

Two triangles are similar if one of the following is true:

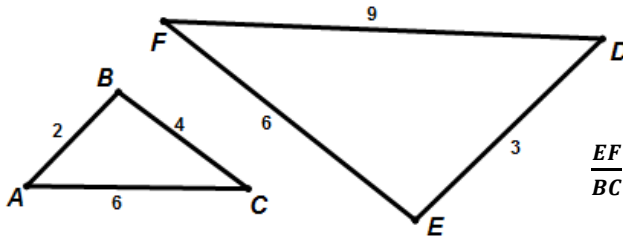
- 1) **(AA)** Two corresponding pairs of angles are congruent.



$$\triangle ABC \sim \triangle FDE$$

(Notice that in the similarity statement above that corresponding angles must match up.)

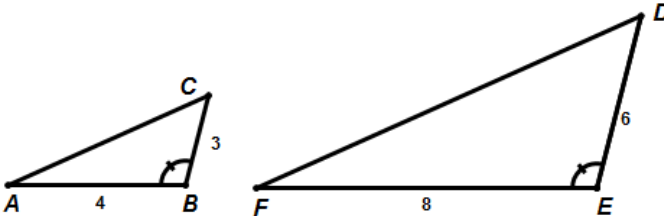
- 2) **(SSS)** Each pair of corresponding sides has the same ratio.



$$\triangle ABC \sim \triangle DEF$$

$$\frac{EF}{BC} = \frac{DE}{AB} = \frac{FD}{CA} = \frac{3}{2} = 1.5$$

- 3) **(SAS)** Two pairs of corresponding sides have the same ratio and the angle between the two corresponding pairs the angle is congruent.



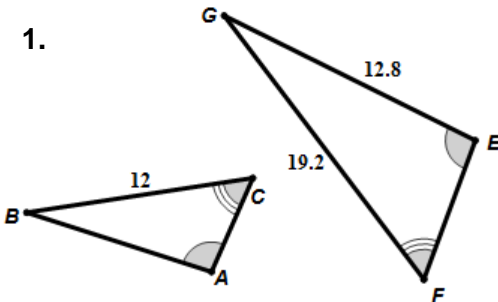
$$\triangle ABC \sim \triangle FED$$

$$\frac{FE}{AB} = \frac{ED}{BC} = 2$$

$$\angle ABC \cong \angle FED$$

Determine whether the following figures are similar. If so, write the similarity ratio and a similarity statement. If not, explain why not.

1.

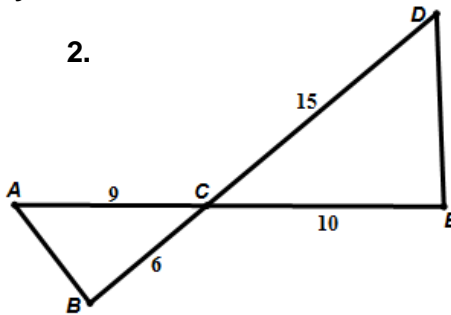


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\_\_\_\_\_

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2.

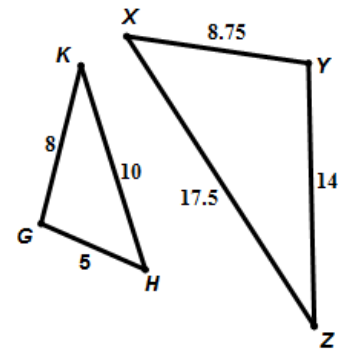


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\_\_\_\_\_

\_\_\_\_\_

3.

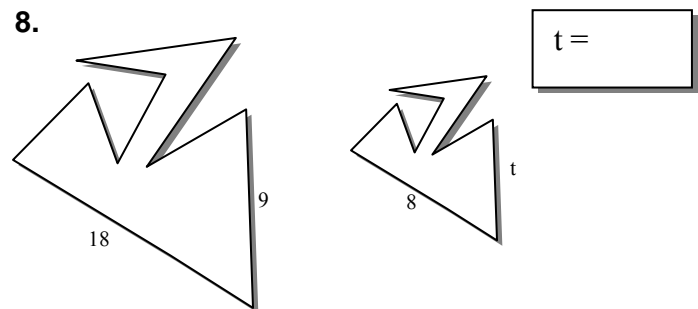
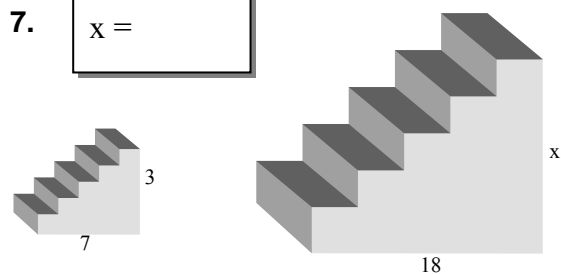
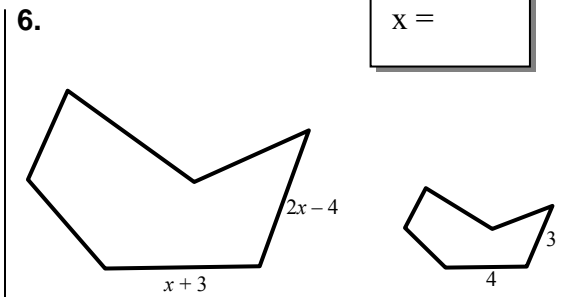
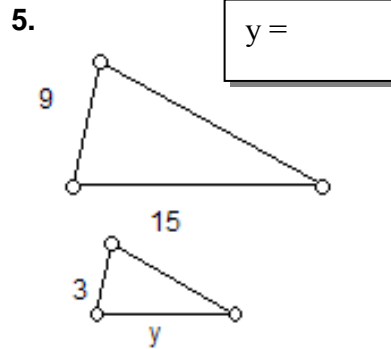
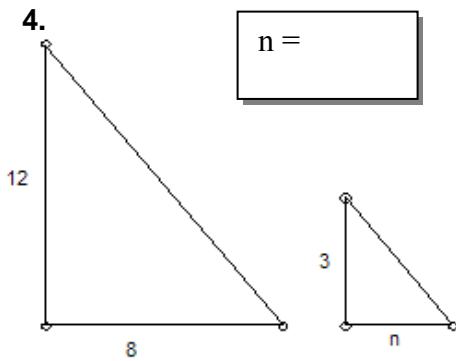


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Assuming the following figures are similar use the properties of similar figures to find the unknown.



9. Given the similarity statement  $\triangle ABC \sim \triangle DEF$  and the following measures, find the requested measures. It may help to draw a picture.

- $AB = 8$
- $AC = 10$

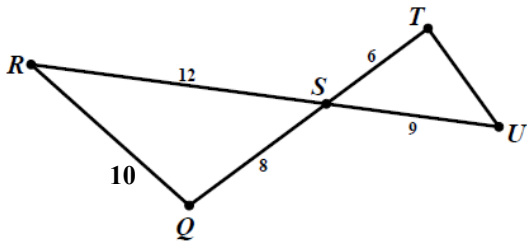
- $DE = 20$
- $EF = 30$

- $m\angle ABC = 40^\circ$
- $m\angle EFD = 30^\circ$

- Find the measure of  $DF =$  \_\_\_\_\_
- Find the measure of  $BC =$  \_\_\_\_\_
- Find the measure of  $m\angle DEF =$  \_\_\_\_\_
- Find the measure of  $m\angle BCA =$  \_\_\_\_\_
- Find the measure of  $m\angle CAB =$  \_\_\_\_\_
- Which angles are **ACUTE**? \_\_\_\_\_
- Which angles are **OBTUSE**? \_\_\_\_\_

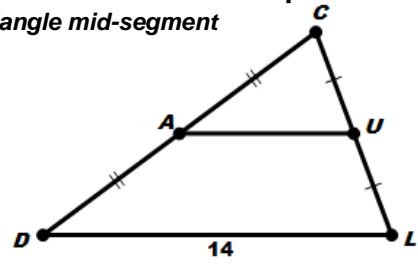
16. Explain why the reason the triangles are similar and find the measure of the requested side.

A)



What is the measure of TU?

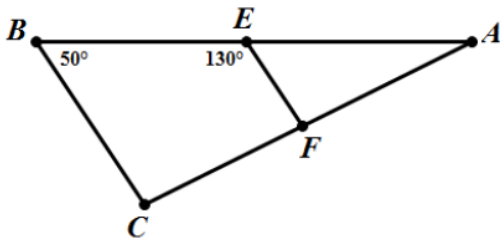
B) Triangle mid-segment



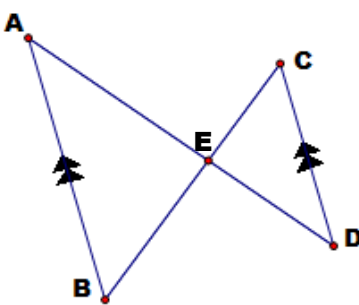
What is the measure of AU?

17. Using (SSS, AA, SAS) which triangles can you determine must be similar? (explain why)

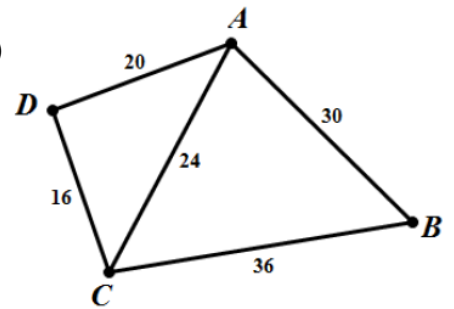
A)



B)



C)



circle one

Similar?	YES	NO
SSS	AA	SAS

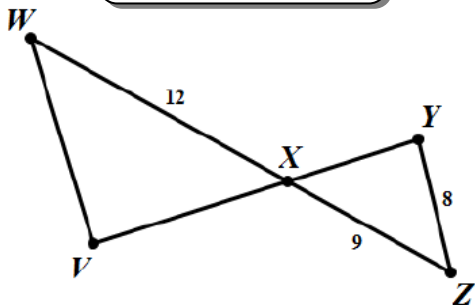
circle one

Similar?	YES	NO
SSS	AA	SAS

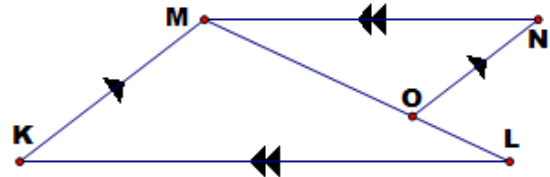
circle one

Similar?	YES	NO
SSS	AA	SAS

D)



E)



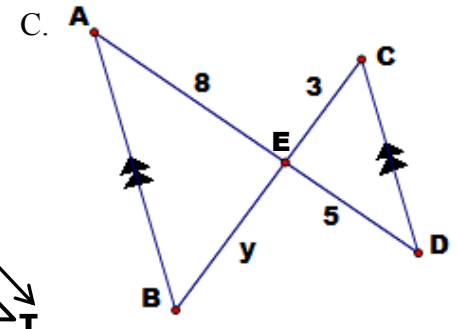
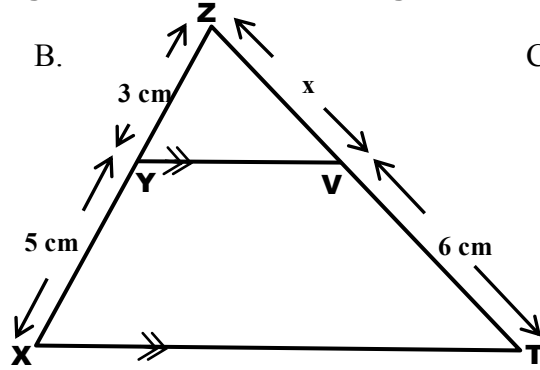
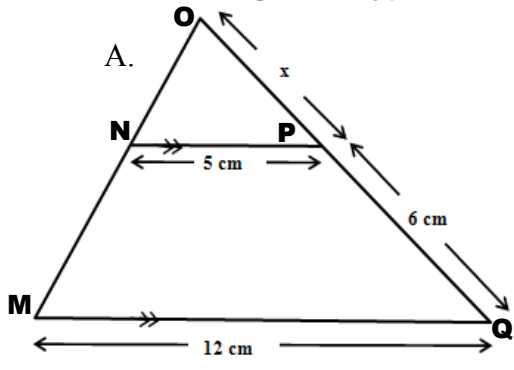
circle one

Similar?	YES	NO
SSS	AA	SAS

circle one

Similar?	YES	NO
SSS	AA	SAS

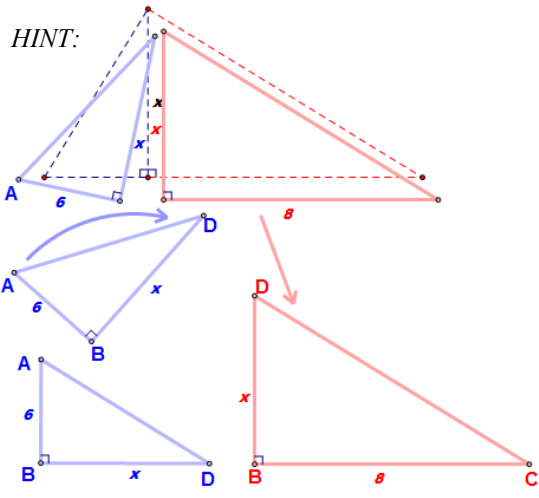
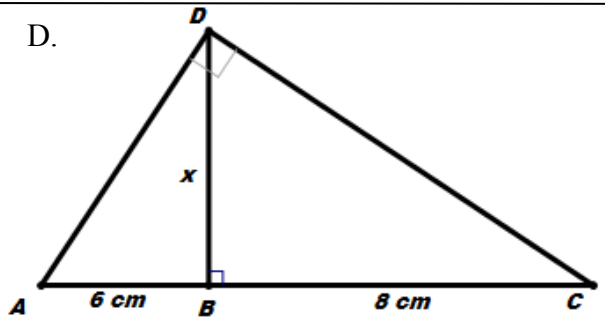
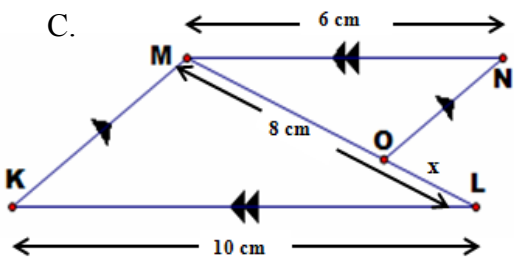
18. Using some type of similar figure find the unknown lengths.



22a.  
x =

22b.  
x =

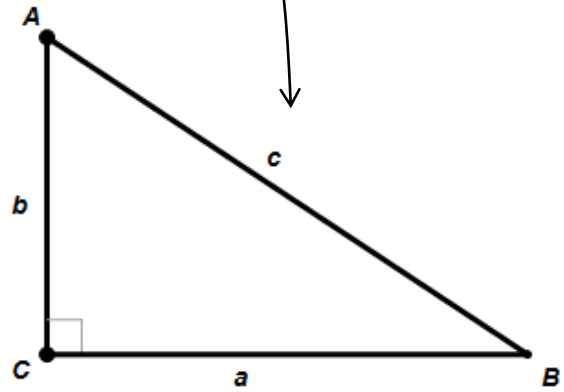
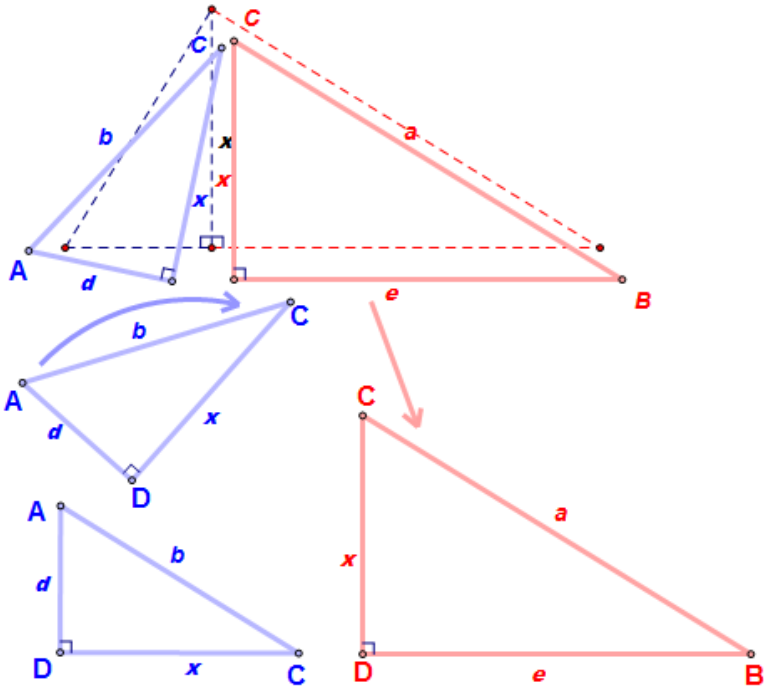
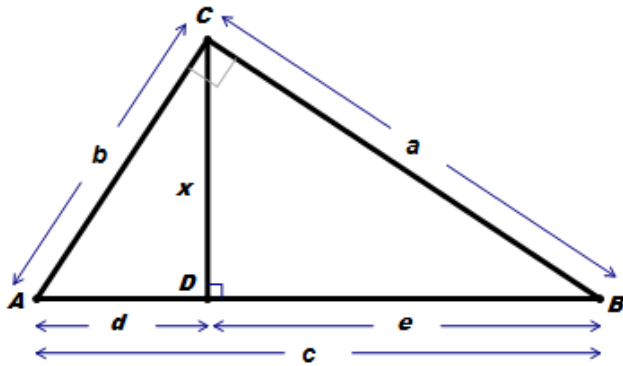
22c.  
y =



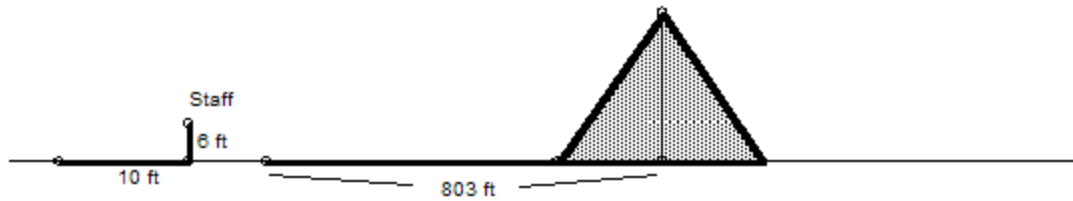
22c.  
x =

22d.  
x =

Prove the Pythagorean Theorem ( $a^2 + b^2 = c^2$ ) using similar right triangles:

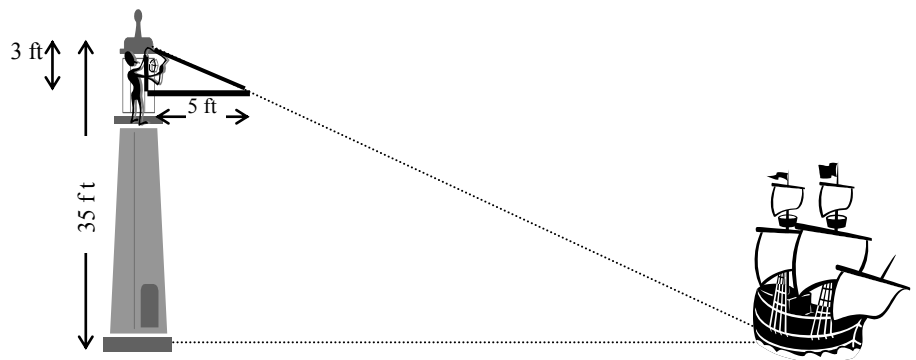


10. Thales was one of the first to see the power of the property of ratios and similar figures. He realized that he could use this property to measure heights and distances over immeasurable surfaces. Once, he was asked by a great Egyptian Pharaoh if he knew of a way to measure the height of the Great Pyramids. He looked at the Sun, the shadow that the pyramid cast, and his 6 foot staff. By the drawing below can you figure out how he found the height of the pyramid?



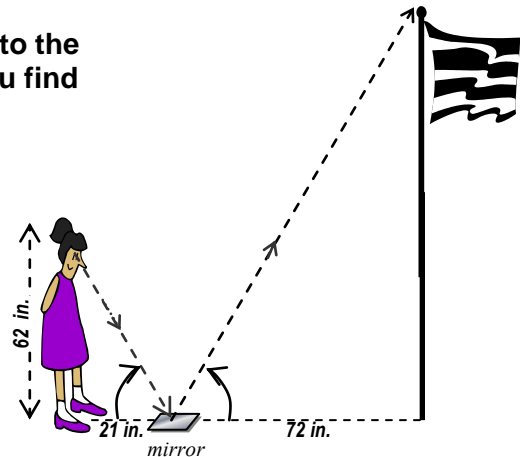
*Height of Pyramid:*

11. Using similar devices he was able to measure ships distances off shore. This proved to be a great advantage in war at the time. How far from the shore is the ship in the diagram?



*Distance from Shore:*

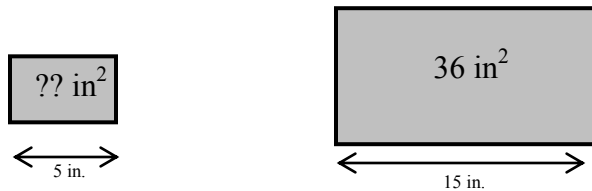
12. Using a mirror you can also create similar triangles (Thanks to the properties of reflection similar triangles are created). Can you find the height of the flag pole?



*Height of the Flag Pole:*

13. Use your knowledge of special right triangles to measure something that would otherwise be immeasurable.

14. Find the unknown area based on the pictures below.

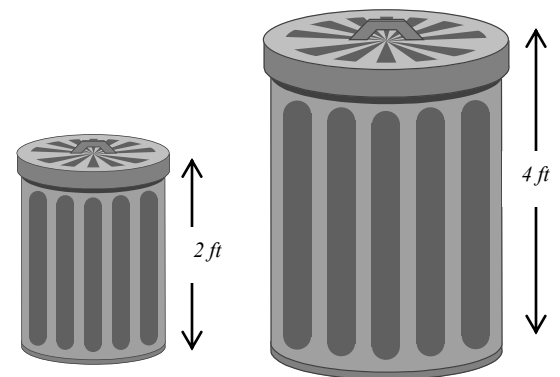


Scale	Length	Area
Factors		

*Area of the small square:*

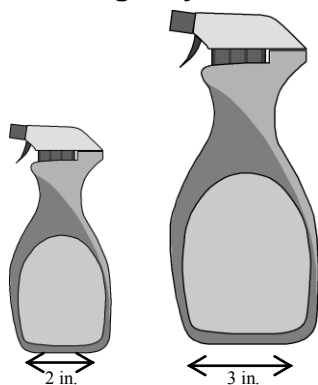
15. If the small can holds 20 gallons how much will the big trashcan hold (assuming they are similar shapes)

Scale	Similarity	Length	Area	Volume
Factors	Ratios			



*Volume of the Large Trashcan:*

16. If the smaller spray bottle holds 37 fl. oz. , then how much does the larger one hold assuming they are similar shapes?

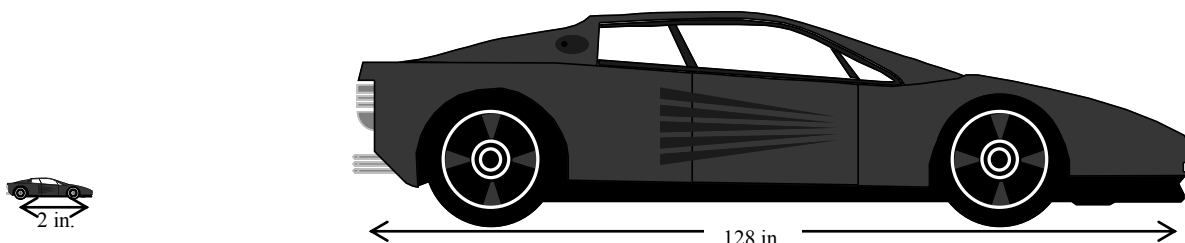


Scale	Similarity	Length	Area	Volume
Factors	Ratios			

*Volume of the Large Spray Bottle:*

17. The smaller of the two cars is a Matchbox car set at the usual  $\frac{1}{64}$ <sup>th</sup> scale (the length) and it takes 0.003 fluid ounces to paint the car. If the smaller is a perfect scale of the actual car and the ratios of the paint remains the same then how many gallons of paint will be needed for the real car? (128 fl. oz = 1 gallon)

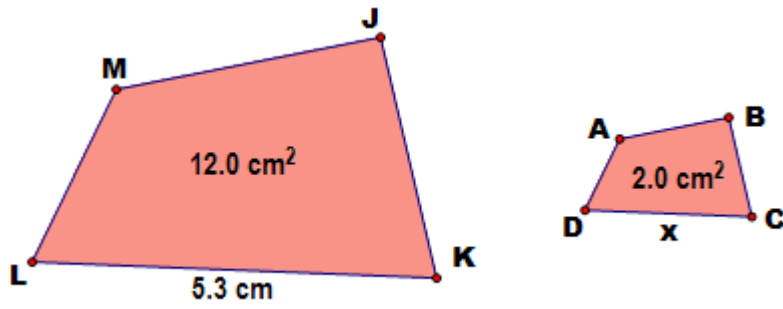
Scale	Similarity	Length	Area	Volume
Factors	Ratios			



*Amount of Paint Needed:*

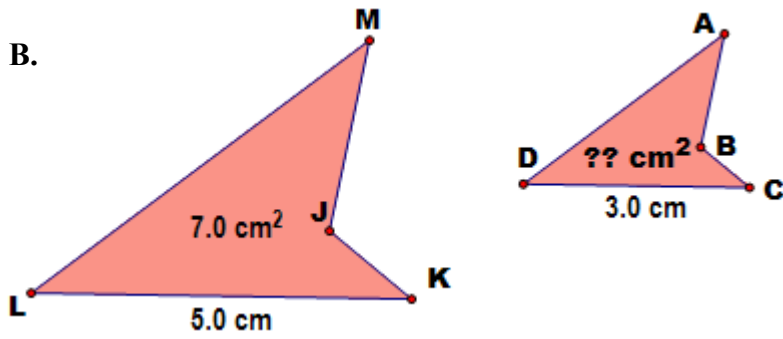
18. If the following are similar determine the length of the unknown sides.

A.



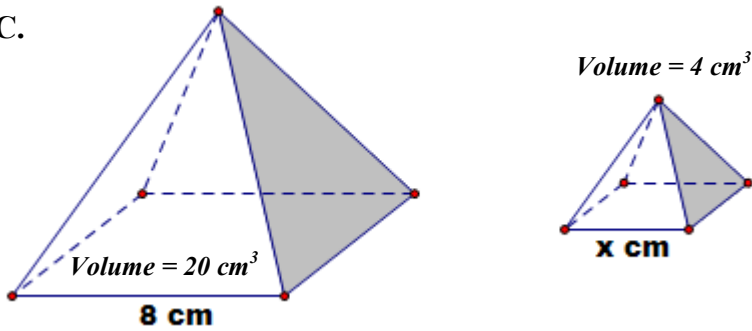
18a.  
x =

B.



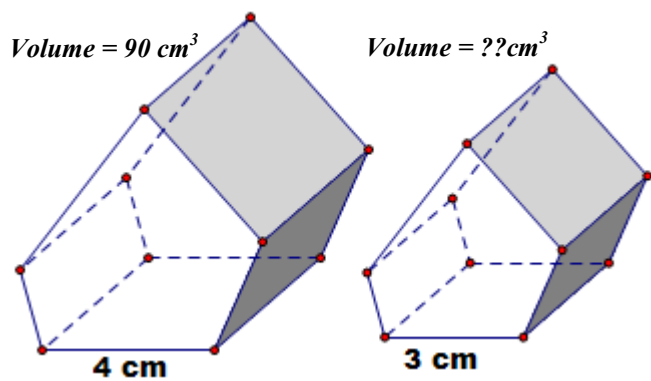
18 b.  
V =

C.



18c.  
x =

D.



18d.  
V =