

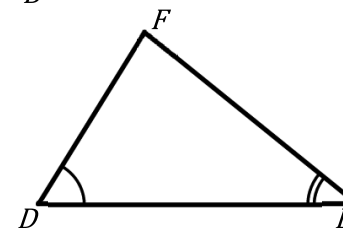
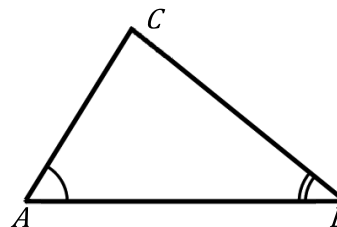
### BEAT THE TEST!

1. The base of the engineering building at Lenovo Tech Industries is approximately a 30 – 60 – 90 triangle with a hypotenuse of about 294 feet. The base of the engineering building at Asus Tech Industries is approximately an isosceles right triangle with a side about  $144.5\sqrt{2}$  feet.

What is the difference between the perimeters of both triangles? Round your answer to the nearest hundredth.

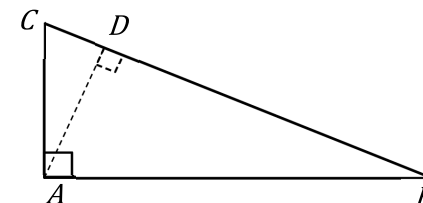
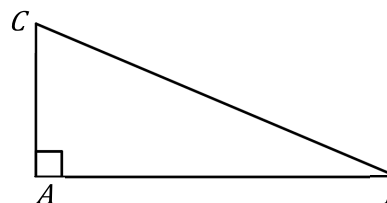
### Section 8 – Topic 6 Right Triangles Similarity – Part 1

Make observations about the following triangles.



These triangles are similar by the \_\_\_\_\_.

Consider the diagram below.



Make observations about  $\triangle ABD$  and  $\triangle ACD$ .

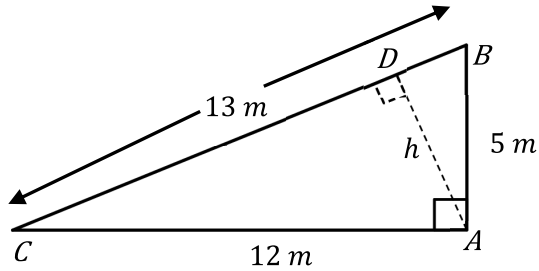
**TAKE NOTE!**  
Postulates &  
Theorems

**Right Triangle Altitude Theorem**

If the altitude is drawn to the hypotenuse of a right triangle, then the two triangles formed are similar to the original triangle and to each other.

**Let's Practice!**

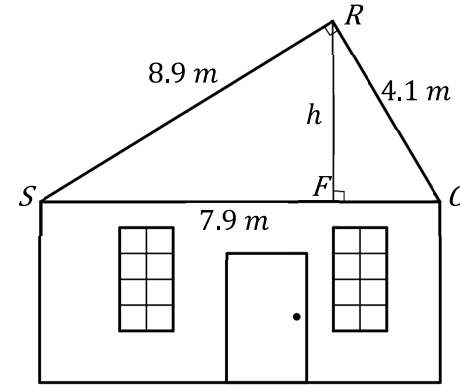
1. Consider the following diagram.



- a. Identify the similar triangles in the above diagram.
- b. Find  $h$  in the above diagram.

**Try It!**

2. A roof has a cross section that forms a right angle. Consider the diagram below that shows the approximate dimensions of this cross section.

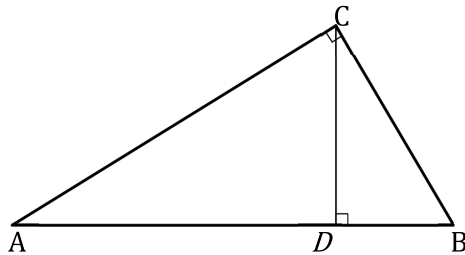


- a. Identify the similar triangles represented in the above figure.
- b. Find the height  $h$  of the roof represented above.

**TAKE NOTE!**  
Postulates &  
Theorems

**Geometric Mean Theorem: Altitude Rule**

In a right triangle, the altitude from the right angle to the hypotenuse divides the hypotenuse into two segments. The length of the altitude is the geometric mean of the lengths of the two segments.

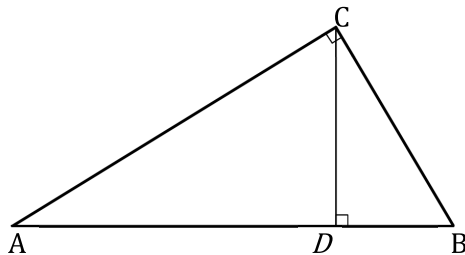


$$\frac{AD}{\square} = \frac{\square}{DB}$$

**TAKE NOTE!**  
Postulates &  
Theorems

**Geometric Mean Theorem: Leg Rule**

In a right triangle, the altitude from the right angle to the hypotenuse divides the hypotenuse into two segments. The length of each leg of the right triangle is the geometric mean of the lengths of the hypotenuse and the segment of the hypotenuse that is adjacent to the leg.

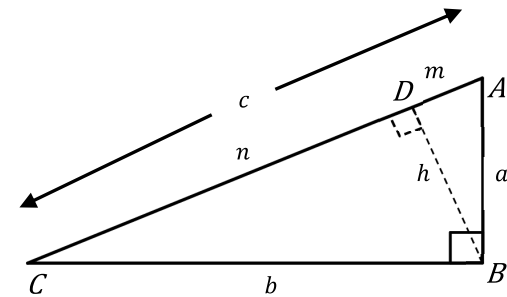


$$\frac{AB}{\square} = \frac{\square}{DB}$$

or

$$\frac{AB}{\square} = \frac{\square}{AD}$$

Consider the following diagram.



Can we accept  $\triangle ADB \sim \triangle BDC$  as a given statement? Justify your answer.

Complete the following two-column proof to prove that  $h = \sqrt{mn}$ .

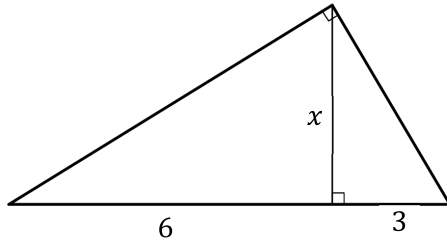
Statements	Reasons
1.	1. Given
2. $\frac{m}{h} = \frac{h}{n}$	2.
3.	3. Multiplication Property Of Equality
4. $h = \sqrt{mn}$	4.



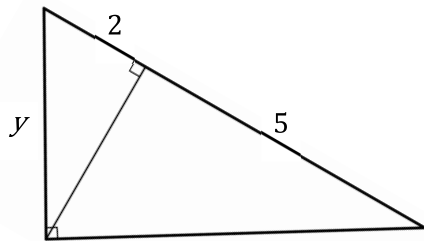
**Section 8 – Topic 7**  
**Right Triangles Similarity – Part 2**

**Let's Practice!**

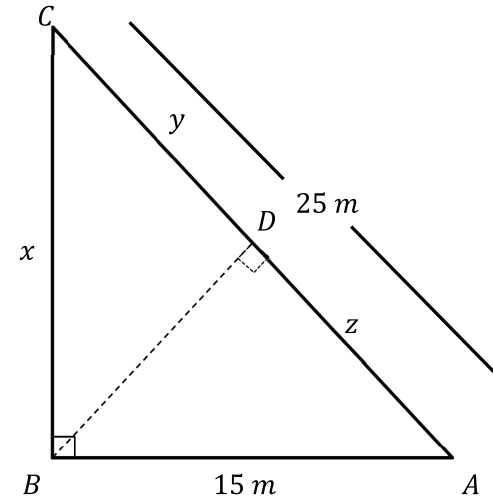
1. Consider the diagram below and find the value of  $x$ .



2. Consider the diagram below and find the value of  $y$ .



3. Consider the diagram below.

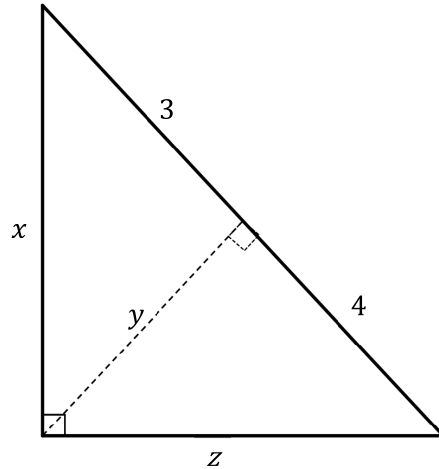


**Given:**  $\triangle CDB \sim \triangle ADB$

**Prove:**  $x = 20\text{ m}$   
 $y = 16\text{ m}$   
 $z = 9\text{ m}$

**Try It!**

4. Consider the diagram below.



Find the values of  $x$ ,  $y$ , and  $z$  to the nearest tenth.

5. A cruise port, a business park, and a federally protected forest are located at the vertices of a right triangle formed by three highways. The port and business park are 6.0 miles apart. The distance between the port and the forest is 3.6 miles, and the distance between the business park and the forest is 4.8 miles.

A service road will be constructed from the main entrance of the forest to the highway that connects the port and business park. What is the shortest possible length for the service road? Round your answer to the nearest tenth.

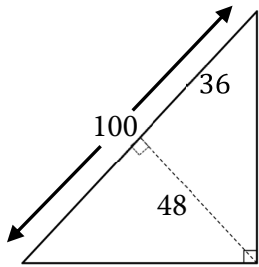
**BEAT THE TEST!**

1. Consider the statement below.

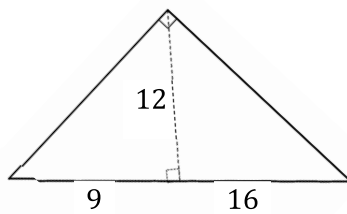
*In a right triangle, the altitude from the right angle to the hypotenuse divides the hypotenuse into two segments. The length of the altitude is the geometric mean of the lengths of the two segments.*

Which of the following figures is a counterexample of the statement above?

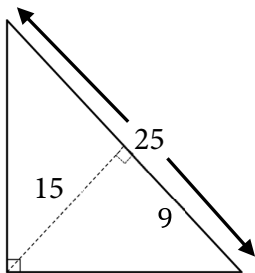
(A)



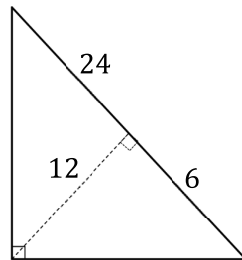
(B)



(C)



(D)



2. A shopping center has the shape of a right triangle with sides measuring  $600\sqrt{3}$  meters, 600 meters, and 1200 meters. During the holidays and busy seasons, the shopping center is so crowded that it needs another walkway. The owners will construct the walkway from the right angle to the hypotenuse. They want to use the shortest possible length for the walkway.

- a. Determine the length of the segment of the hypotenuse adjacent to the shorter leg.

meters

- b. Determine the length of the new walkway.

meters