



Bellwork

- From the textbook page 456 – 457 #15, 16, 25

7.4 Similar Right Triangles

LT – How do you find the geometric mean of two numbers?

LT – How is geometric mean used to find measurements in similar right triangles?



Geometric Mean

- For any two positive numbers a and b , the geometric mean of a and b is the positive number x such that $\frac{a}{x} = \frac{x}{b}$

Example: What is the geometric mean of 3 and

27?

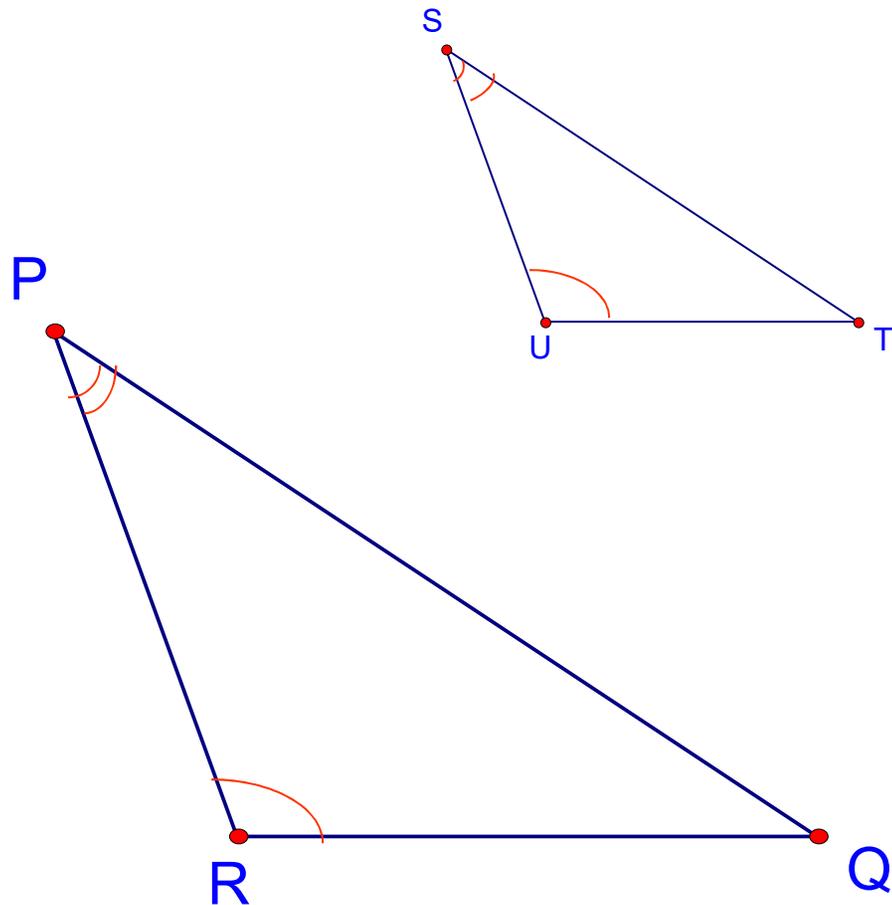
$$\frac{3}{x} = \frac{x}{27}$$

$$x^2 = 81$$

$$x = 9$$

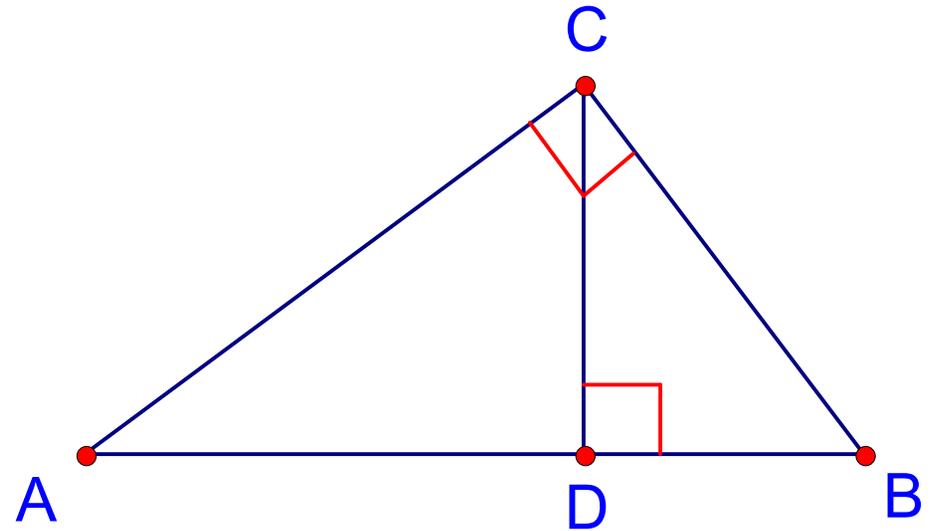
Remember: Proportions in right triangles

- In Lesson 7.3, you learned that two triangles are similar if two of their corresponding angles are congruent. For example $\triangle PQR \sim \triangle STU$. Recall that the corresponding side lengths of similar triangles are in proportion.



Theorem 7.3

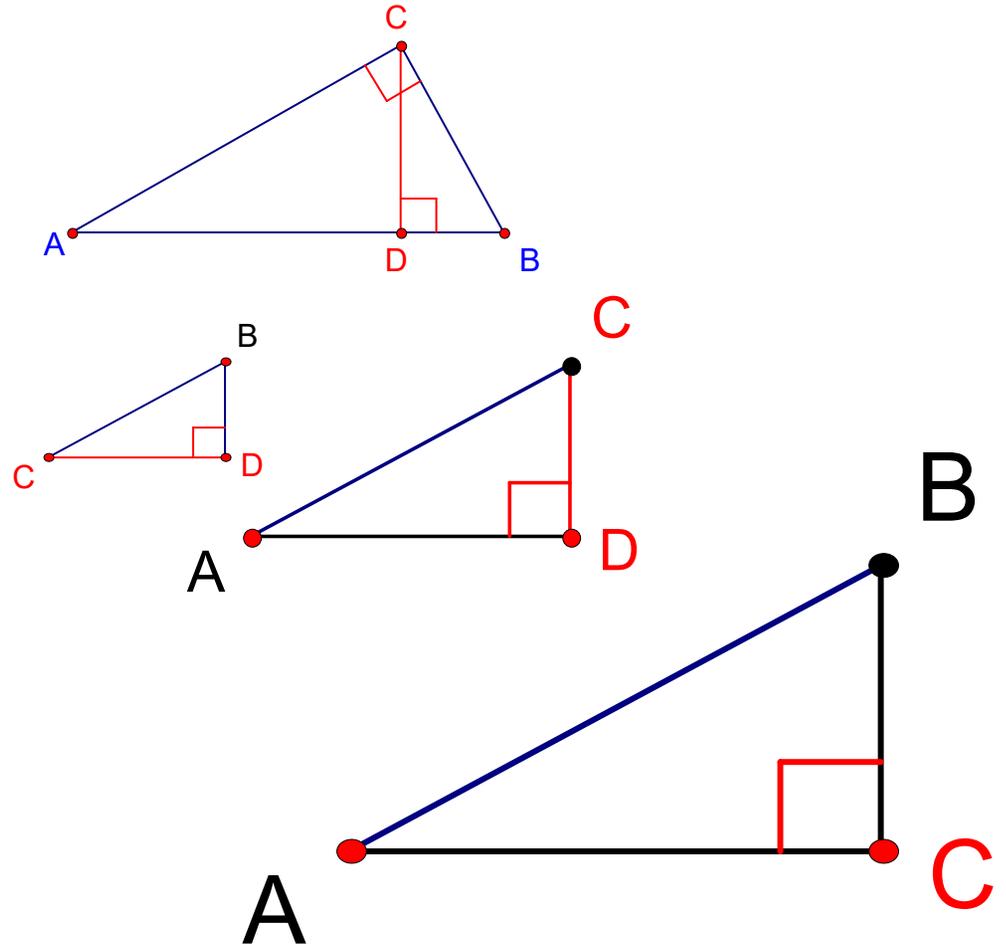
- If the altitude is drawn to the hypotenuse of a right triangle, then the two triangles formed are similar to the original triangle and to each other.



$$\triangle CBD \sim \triangle ABC, \triangle ACD \sim \triangle ABC, \triangle CBD \sim \triangle ACD$$

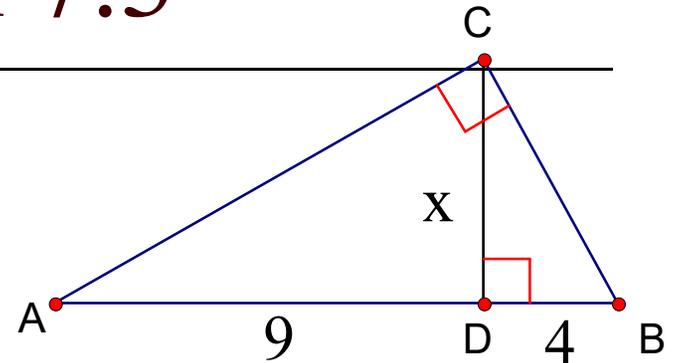
Using a geometric mean to solve problems

- In right $\triangle ABC$, altitude CD is drawn to the hypotenuse, forming two smaller right triangles that are similar to $\triangle ABC$. From Theorem 7.3, you know that $\triangle CBD \sim \triangle ACD \sim \triangle ABC$.



Corollary 1 to Theorem 7.3

- 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



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

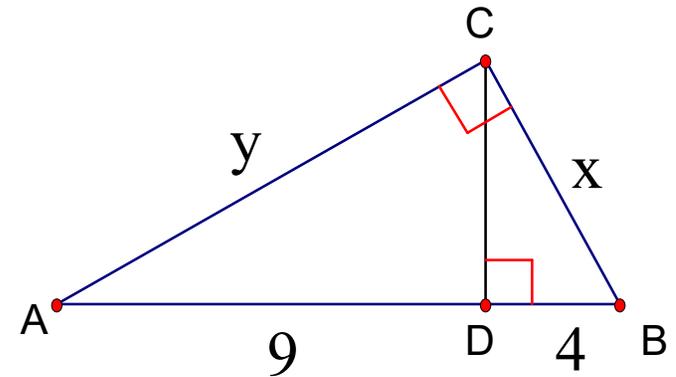
$$x^2 = 36$$

$$\sqrt{x^2} = \sqrt{36}$$

$$x = 6$$

Corollary 2 to Theorem 7.3

- **Corollary 2 to 7.3:** 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.



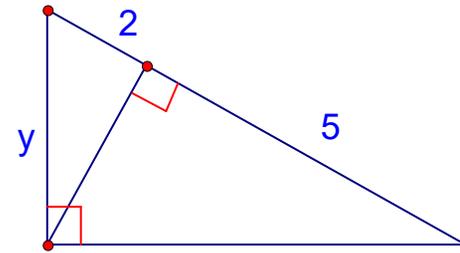
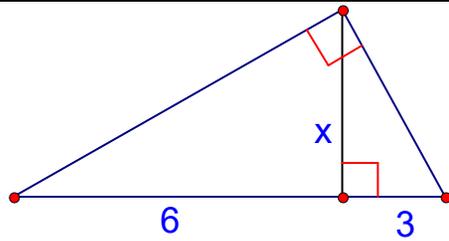
$$\frac{9+4}{x} = \frac{x}{4}$$

$$\frac{13}{x} = \frac{x}{4}$$

$$x^2 = 52$$

$$x = \sqrt{52} = 7.2$$

What does that mean?



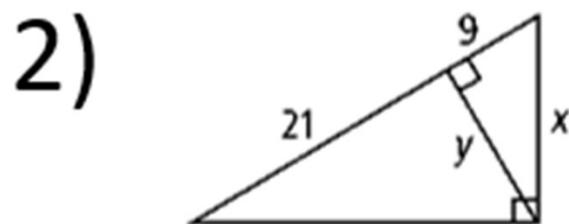
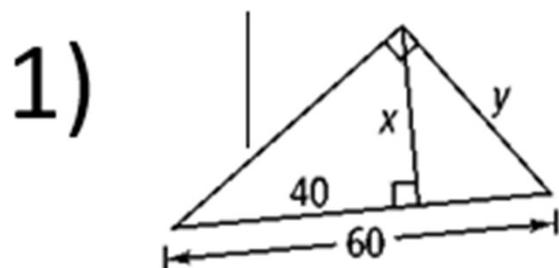


Recap

- The altitude is the geometric mean of the two sections of the hypotenuse.
- The leg is the geometric mean of the hypotenuse and the segment of the hypotenuse touching it
- Geometric mean: multiply the numbers, take the square root.

Bellwork 2/7/17

Use proportions to solve for the missing variables.





Whiteboard Problems

- Textbook pg. 465 # 10, 18, 20, 24, 38, 40