Similarity in Right Triangles

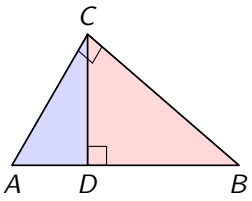
Today I Can

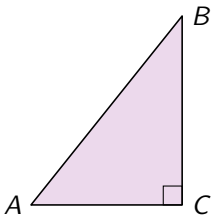
1. Find and use relationships in similar right triangles.

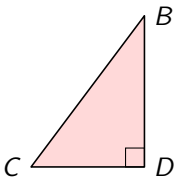
Altitudes in Right Triangles

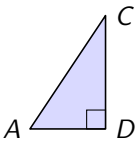
An altitude drawn from the right angle of a right triangle creates 3 similar triangles.

- $\triangle ABC \sim \triangle CBD \sim \triangle ACD$



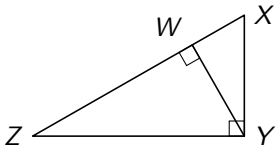




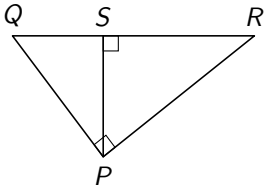


Example 1. What similarity statement can you write relating the three triangles in each diagram?

(a)



(b)



Geometric Mean

The **geometric mean**, x, of two positive numbers a and b is the solution of

$$\frac{a}{x} = \frac{x}{b}$$

Example 2. Find the geometric mean of each pair of numbers.

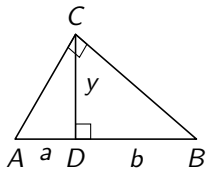
(a) 6 and 15

(b) 4 and 18

Altitude as a Geometric Mean

An altitude drawn from the right angle of a right triangle is the geometric mean of the 2 segments it creates on the hypotenuse.

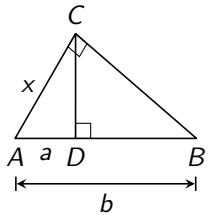
- $\frac{a}{y} = \frac{y}{b}$



Leg as a Geometric Mean

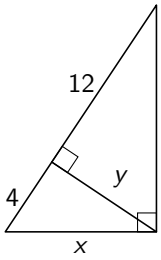
If an altitude is drawn from the right angle of a right triangle, then a leg is the geometric mean of the large triangle's hypotenuse and the segment on the large hypotenuse adjacent to the leg.

- $\frac{a}{x} = \frac{x}{b}$



Example 3. Find the values of x and y in each.

(a)



(b)