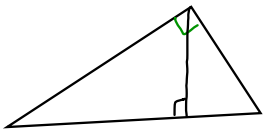
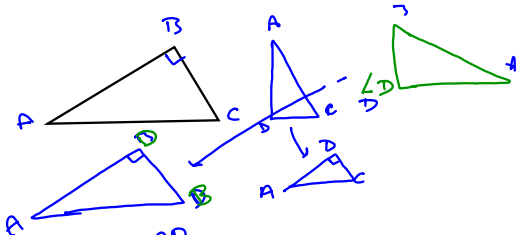
8.7 Similarity in Right Triangles



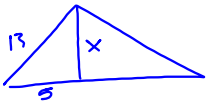
The altitude from the right angle creates two triangles that are similar to the original triangle

Similar
- Same shape
  different size

all angles are congruent to corresponding angles
all sides are proportional to the corresponding side



$\frac{AD}{AB} = \frac{BD}{BC}$



1. Pythagorean Thm

$a^2 + b^2 = c^2$

c is the hypotenuse

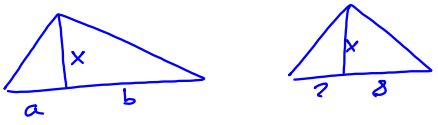
$5^2 + b^2 = 13^2$

$25 + b^2 = 169$

$-25 \quad -25$

$b^2 = 144$

$b = 12$

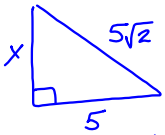


2. Geometric Mean

A proportion where x is the "mean" of a and b

$\frac{a}{x} = \frac{x}{b} \Rightarrow x^2 = a \cdot b$

$\frac{2}{x} = \frac{x}{8} \Rightarrow x^2 = 16 \quad x = 4$

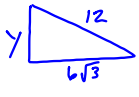


$5^2 + x^2 = (5\sqrt{2})^2$

$25 + x^2 = 50$

$x^2 = 25$

$x = 5$



$(6\sqrt{3})^2 + y^2 = 12^2$

$108 + y^2 = 144$

$y^2 = 36$

$y = 6$