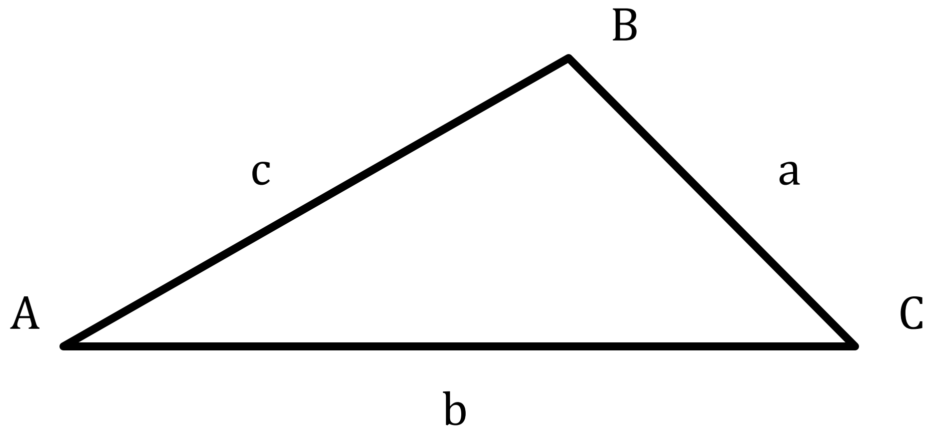
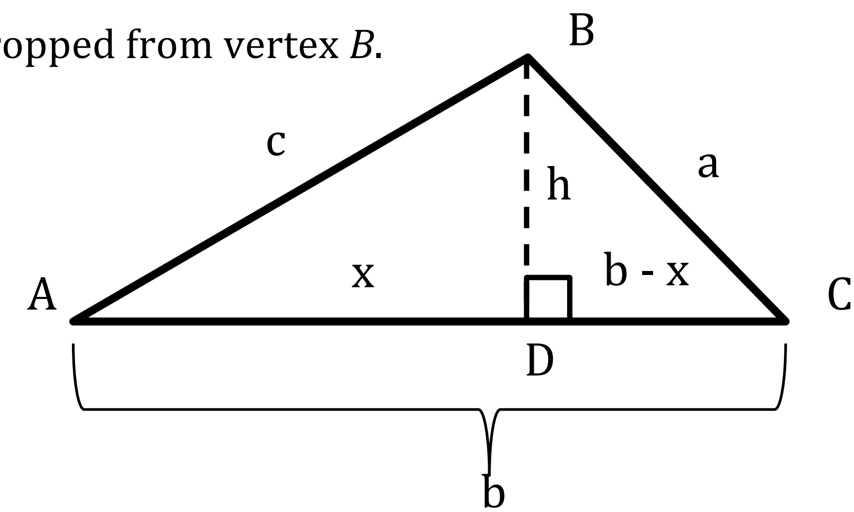
Given $\triangle ABC$ is **not** a right triangle. The length of a given side ***a*** can be determined by the Law of Cosines: $a^2 = c^2 + b^2 - 2bcCos\ A$



Proof

A perpendicular auxiliary can be dropped from vertex *B*.



Also note that,

$Sin\ A = \frac{h}{c} \Rightarrow h = cSin\ A$

$Cos\ A = \frac{x}{c} \Rightarrow x = cCos\ A$

Deriving the Law of Cosines	
STEPS	**REASONS**
$a^2 = h^2 + (b - x)^2$	Applying the Pythagorean Theorem to $\triangle\ CBD$
$a^2 = (cSin\ A)^2 + (b - cCos\ A)^2$	Substituting for *h* and *x*
$a^2 = (c^2Sin^2A) + (b^2 - 2bcCos\ A + c^2Cos^2A)$	Simplifying by multiplying the squared-binomial
$a^2 = (c^2Sin^2A + b^2 - 2bcCos\ A + c^2Cos^2A)$	Simplifying
$a^2 = c^2(Sin^2A + Cos^2A) + b^2 - 2bcCos\ A$	Simplifying by factoring out the common factor c^2 and rewriting using the Associative Property of Addition
$a^2 = c^2(1) + b^2 - 2bcCos\ A$	Simplifying using the Pythagorean Identity $Sin^2A + Cos^2A = 1$
$a^2 = c^2 + b^2 - 2bcCos\ A$	Simplifying

The same process can be used to find the length of ***b*** and ***c***.