You can also solve triangles that are not right triangles using the *Law of Cosines*. There are three rules that make up the law of cosines, but you only need to memorize one because the other two can be obtained by changing the letters (put *b* in place of *a*, for example). All three rules are listed below.

$a^2 = b^2 + c^2 - 2bc(\cos A)$

$b^2 = a^2 + c^2 - 2ac(\cos B)$

$c^2 = a^2 + b^2 - 2ab(\cos C)$

The *law of cosines* can be used in two different cases. First, if you know the lengths of all three sides of a triangle, you can use the law of cosines. Secondly, you can use the law of cosines when two sides and the included angle are known.

Example:

1. Problem: In *triangle ABC*, *a = 24*, *c = 32*, and *angle B = 115°*. Solve the triangle.

Solution: We know two sides. Find the third using the law of cosines.

$b^2 = a^2 + c^2 - 2ac(\cos B)$

Plug in any known information.

$b^2 = 24^2 + 32^2 - 2 * 24 * 32(-.4226)$
$b^2 = 2249$

Solve for *b* by taking the square root of each side.

$b = SQRT(2249) = 47.4$

Using the law of sines, *angle A = 27.32°*.

Since we know that triangles are made of three angles that sum to *180°*, we can find the measure of *angle C* by setting up an equation.

Angle C = 180° - 115° - 27.32° = 37.68°