8-7 Law of Cosines

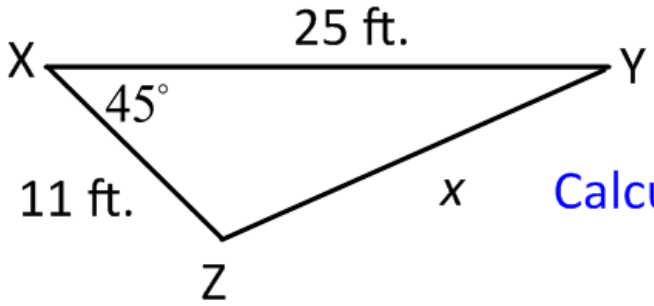
For any triangle ABC, the following equations are true.

$$a^2 = b^2 + c^2 - 2bc\cos A$$
$$b^2 = a^2 + c^2 - 2ac\cos B$$
$$c^2 = a^2 + b^2 - 2ab\cos C$$

In words: "The square of one side of the triangle is equal to the sum of the squares of the other two sides, less the product of the other 2 sides and 2 times the cosine of the included angle."

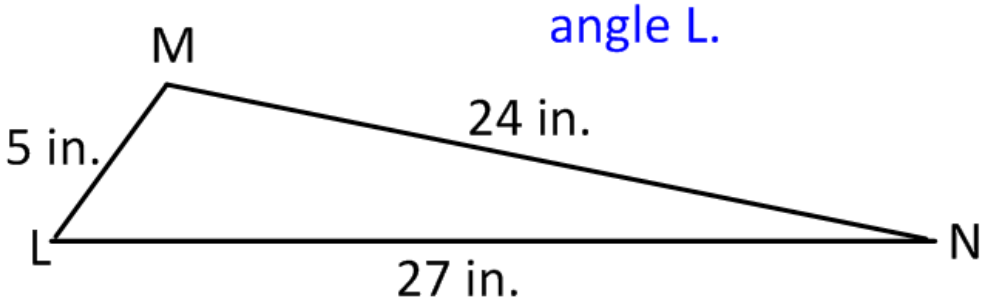
Notice that each equation is in the same form, with the letters changed. If you memorize 1 form, you should be able to build the others when you need them.

Applying the Law of Cosines



Calculate the value of *x*.

Find the measure of angle L.



Solve triangle LMN, given:

$m\angle M = 46$

$m\angle L = 55$

$n = 16$ m

1. Draw the triangle, so you can see the relative orientation of the parts.
2. Decide whether you should use the Law of Cosines or the Law of Sines. (If you can, use the Law of Sines, as it can be simpler to solve.)
3. Carry out your calculations, remembering to solve for the largest angle of the triangle first!
4. After you solve using the Law of Cosines for one missing measure, you can normally continue to solve the triangle using the Law of Sines and/or the Angle Sum Theorem.

Solve triangle LMN, given:

n = 17 cm

m = 20 cm

l = 14 cm

Remember: Solve for the largest angle first!