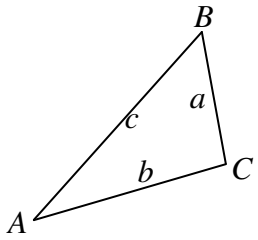
Precalculus 115, section 6.5 Law of Sines

notes prepared by Tim Pilachowski

So far in chapter 6 we have looked at specifically right triangles. What can we say about other types of triangles? This section introduces the Law of Sines. In section 6.6 we'll look at the Law of Cosines.



The Law of Sines. Given a triangle with angles A, B and C, with sides opposite those angles a, b and c respectively, $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$. If we know any angle and the length of the side opposite it, then with any other piece of information we can solve for the rest of the triangle.

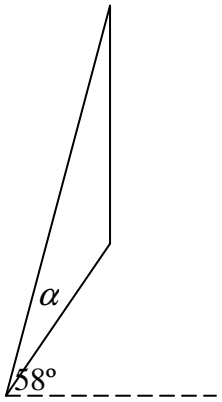
Example A: Given $\angle A = 30°,\ \angle B = 80°,\ a = 300$, sketch and then solve the triangle.

Example B: Given $\angle A = 40°,\ a = 50,\ b = 60$, sketch and then solve the triangle.

Two things:

1) When using a calculator, make sure the mode is set to radians when you have radians, and degrees when you have degrees. In this case we needed degrees
2) This value for sin B should make sense to you. In the picture, the angle is "tall", and we should expect it to have a sine value close to 1.

Example C (text # 40): A communications tower is located at the top of a steep hill. The angle of inclination of the hill is 58º. A guy wire is to be attached to the top of the tower and to the ground, 100 m downhill from the base of the tower. The angle α is determined to be 12º. Find the length of the cable required for the guy wire.



[picture is not drawn to scale]