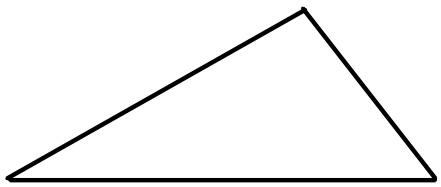
TRIG 3.1 ~ Law of Sines

- Prove the Law of Sines
- Use the Law of Sines to solve triangles.
- Identify when the solution to the triangle is ambiguous.
- Find the area of triangles.

We will now apply our techniques to solving oblique triangles (those with no right angles.)

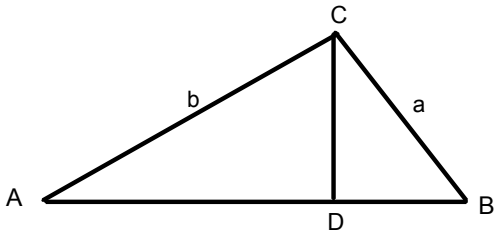
How to label sides and angles:



Law of Sines: If ABC is a triangle with sides a,b,c then

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Proof: Given triangle ABC
Draw altitude $\overline{CD}$ to side $\overline{AB}$
Let CD = h



c

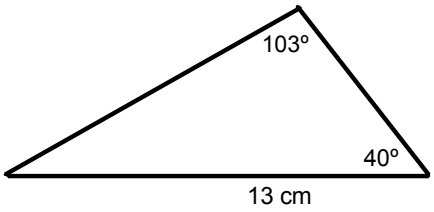
In ΔADC, sin A =

In ΔBCD, sin B =

Solve each for h= h =

Example 1:

Solve for the missing sides and angle.



Example 2: What if we are looking for an angle?

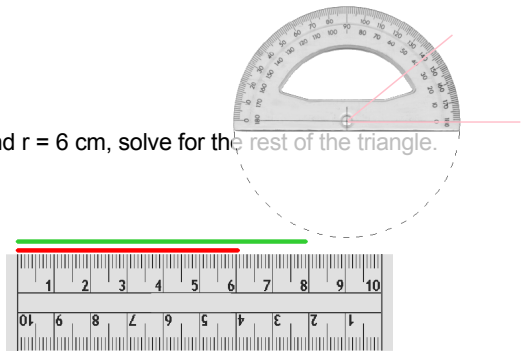
Triangle MKL with $\angle M = 100^\circ$
m = 15 ' k = 10'

Solve for the remaining parts of the triangle.

Example 3: The ambiguous case

Remember from Geometry the dreaded SSA?

Given triangle RST with $\angle R = 40^\circ$, t = 8 cm and r = 6 cm, solve for the rest of the triangle.



Finding the area of a traingle.

Area of triangle = 1/2 bh