SM 3H

Date: **Section:**

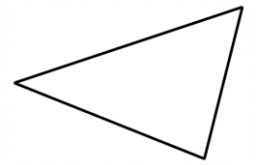
Objective:

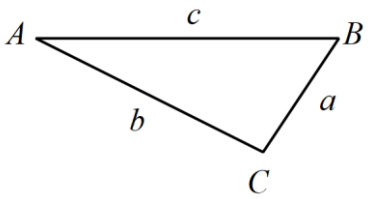
What if an oblique triangle is not a ASA, AAS, or SSA triangle? What do we use instead?

Law of Cosines

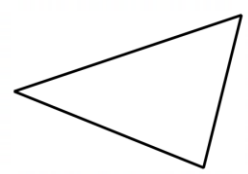
★ When do you use Law of Cosines?

SSS triangle





SAS triangle



Law of Cosines:

Solve for the ***largest*** side or angle first!!!!!!!

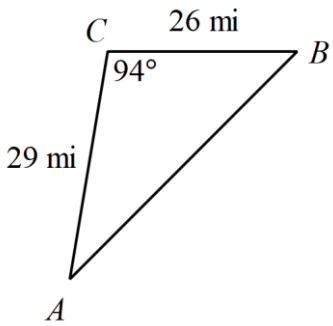
OR

OR

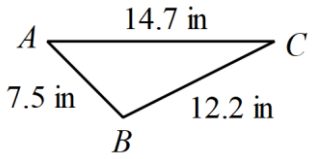
SSS: Use the fact that the largest angle is across from the longest side of the triangle to solve for the largest angle using the law of cosines. (For example, if *c* is the longest side, use the equation $c^2 = a^2 + b^2 - 2ab\cos\gamma$ to solve for γ.) Then use the law of sines to find the remaining angles, which will both be acute. **Don't use the law of sines to solve for any angle that might be obtuse! The law of sines will always give you acute angle measures!**

Example:

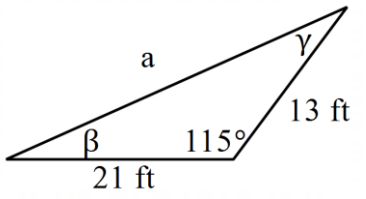
a. Find AB



b. Find $m\angle B$



Example: Solve each triangle. Round your answers to the nearest tenth.



$m\angle\alpha =$ _____ $a =$ _____

$m\angle\beta =$ _____ b = _____

$m\angle\gamma =$ _____ c = _____

Example: Jan and Dean started hiking from the same location at the same time. Jan hiked at 4 mph with bearing N12°E, and Dean hiked at 5 mph with bearing N31°W. How far apart were they after 6 hours? Round to the nearest tenth of a mile.

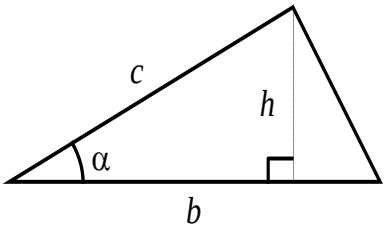
Example: Ms. Peterson and Ms. Gordon left the airport at the same time. Ms. Peterson flew at 180 mph on a course with bearing 80 degrees, and Ms. Gordon flew at 240 mph on a course with bearing 210 degrees. How far apart were they after 3 hours? Round to the nearest tenth of a mile.

Area of an Oblique Triangle

The formula _____ gives the area of a triangle

if you are given the base and the height.

What is another way we can write the height using other sides and angles?



Using substitution, we derive the formula_____, which you use with a SAS triangle.

Depending on which angles and sides are known, the formulas_____ and _____can also be used.

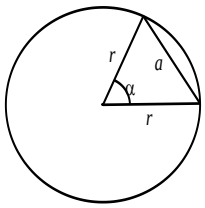
Examples:

a. Find the area of the triangle with $\alpha = 39.4^\circ,\ b = 12.6,$ and $c = 13.7$

b. Find the area of a triangle with $\alpha = 56.3^\circ,\ \beta = 41.2^\circ,$ and $a = 9.8$

c. Find the area of the triangle with $a = 12,\ b = 8,$ and $c = 6$

Length of a Chord: If a chord of length a is intercepted by a central angle α in a circle of radius r, then $a = r\sqrt{2 - 2\cos\alpha}$. (This formula is derived from the law of cosines.)



Example: Find the length of the chord intercepted by a central angle of 33.8° in a circle of radius 22.4 ft.