Area of a Triangle Video Lecture

Section 8.4

Course Learning Objectives:
Demonstrate an understanding of trigonometric functions and their applications.

Weekly Learning Objectives:

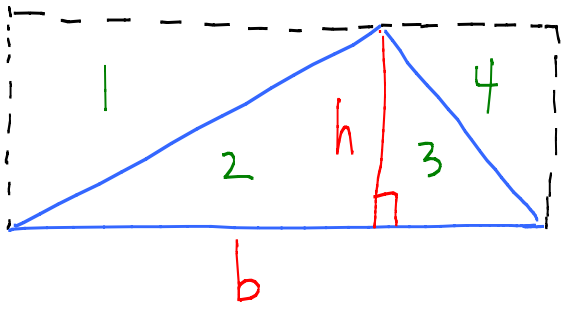
1) **Find the area of SAS triangles.**
2) **Find the area of SSS triangles.**

Area of a Triangle

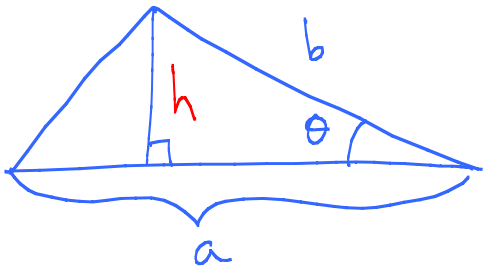
You are probably already familiar with the area of a triangle formula:

$$A = \frac{1}{2}bh$$

Proof:



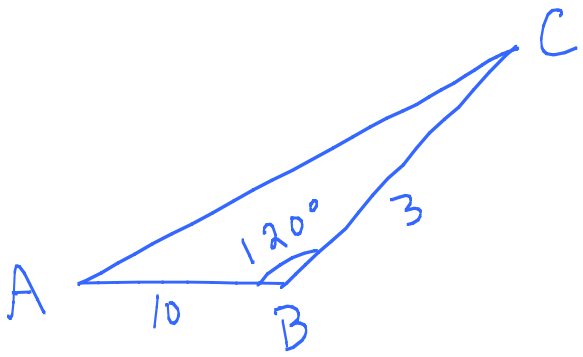
What if we don't know the base and the height of the triangle, but instead know 2 sides and the included angle. (SAS)



$A = \frac{1}{2}bh =$

This formula is true for both acute and obtuse angles θ.

Example: Find the area of the triangle illustrated.



Heron's Formula for finding the area A of a $\triangle$ if you are given the lengths of the sides. (SSS)

The area A of $\triangle ABC$ if given by

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

where $s = \frac{1}{2}(a+b+c)$ is the semiperimeter of the triangle.

Example

You own a triangular lot that has sides of 371 feet, 280 feet, and 160 feet. What is the area?

Proof of Heron's Formula:

$c^2 = a^2 + b^2 - 2ab\cos C$ $\qquad\qquad$ $A = \frac{1}{2}ab\sin C$

$\cos C = \frac{a^2+b^2-c^2}{2ab}$