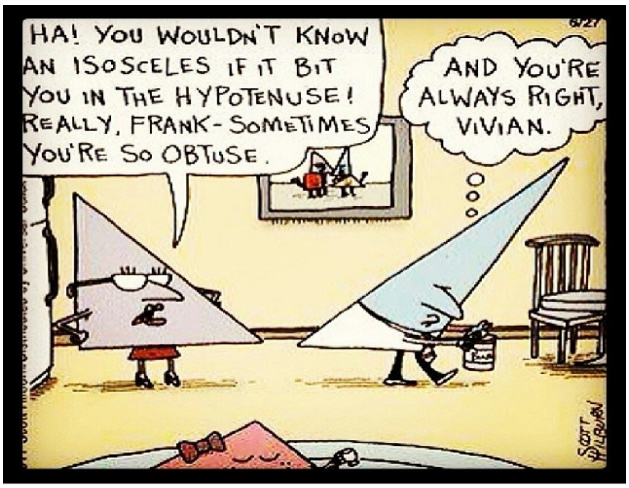
Precalculus
Lesson 8.4: Area of a Triangle
Mrs. Snow, Instructor



If we know two sides of a triangle and the included triangle we may apply the general formula for the area of a triangle (SAS).

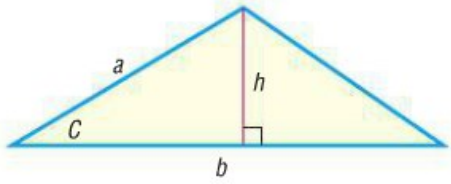
$$\sin C = \frac{h}{a}$$

solving for h:

$$h = a \sin C$$

so area is:

$$K = \frac{1}{2}bh = \frac{1}{2}ab \sin C$$



To find area of a triangle knowing SAS

$$K = \frac{1}{2}ab \sin C$$
$$K = \frac{1}{2}ac \sin B$$
$$K = \frac{1}{2}bc \sin A$$

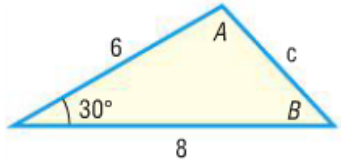
From the law of cosines comes **Heron's Formula** that may be used to find the area of a triangle if only given the lengths of the three sides (SSS):

For a triangle with sides of lengths $a, b, and\ c$, it will have a **semiperimeter** of:

$$\boldsymbol{s = \frac{1}{2}(a + b + c)}$$

the area of the triangle is:

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

Find the area of a triangle whose sides are
$a = 4, b = 5, c = 7$

Find the area of the triangle: