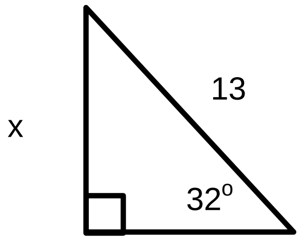
Using Trig to solve problems.

Ex 1. Find the missing side:



1. Determine what sides you have. x = the opposite

   13 = the hypotenuse

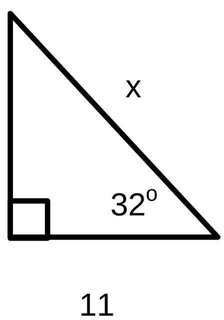
2. Determine which trig function uses those sides: Sine

3. Set up the equation: $\sin 32° = \frac{x}{13}$

4. Solve the problem: $13 \times \sin 32° = \frac{x}{13} \times 13$

   $13 \times \sin 32° = x$ $\quad x = 13 \times 0.530 = 6.89$

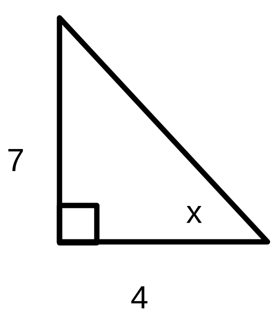
Ex 2. Find the missing side:



1. x = the hypotenuse, 11 = the adjacent
2. Use Cosine
3. The equation is: $\cos 32° = \frac{11}{x}$
4. Solve: $x \times \cos 32° = \frac{11}{x} \times x$

   $x \cos 32° = 11 \quad x = \frac{11}{cos 32°} = \frac{11}{0.848} = 12.97$

Ex 3. Find the missing angle:



1. 7 = the opposite, 4 = the adjacent
2. Use Tangent
3. The equation is: $\tan x = \frac{7}{4}$

Remember when we invented logs to solve exponential problems: $(b^x = y \leftrightarrow x = \log_b y)$

Now we invent INVERSE trig functions to liberate the angle from the trig equation.

For $\sin \theta$, the inverse is the "inverse sine" or "arcsine" function, written as $\sin^{-1} \theta$

So to finish example 3… $\tan^{-1} (\tan x) = \tan^{-1} \left(\frac{7}{4}\right)$ → $x = \tan^{-1} \left(\frac{7}{4}\right) = \tan^{-1}(1.75) = 60.25°$