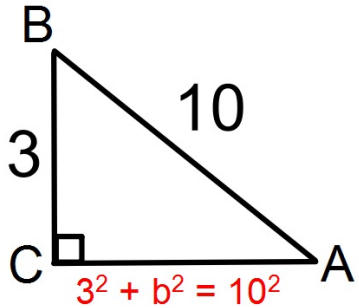
# Bellwork

1. Set up the 6 basic trigonometric functions for the given triangle using angle A.




$3^2 + b^2 = 10^2$

$9 + b^2 = 100$

$-9 \qquad -9$

$b^2 = 91$

$b = \sqrt{91}$

$\sin A = \frac{3}{10}$

$\csc A = \frac{10}{3}$

$\cos A = \frac{\sqrt{91}}{10}$

$\sec A = \frac{10 \cdot \sqrt{91}}{\sqrt{91} \cdot \sqrt{91}} = \frac{10\sqrt{91}}{91}$

$\tan A = \frac{3 \cdot \sqrt{91}}{\sqrt{91} \cdot \sqrt{91}} = \frac{3\sqrt{91}}{91}$

$\cot A = \frac{\sqrt{91}}{3}$

2. How many degrees is the sum of all three angles in a triangle? $180^\circ$

# Solving Triangles

Given Information Possibilities:

1. The measure of 1side and 1angle
2. The measure of 2 sides

Wanted Information:

1. The measure of all 3 sides
2. The measure of all 3 angles

# Solving Right Triangles:

## Given 1 side and 1 angle

Procedure:

1. Find the third angle.
   Do so by $90^0$ - Given Angle = ?

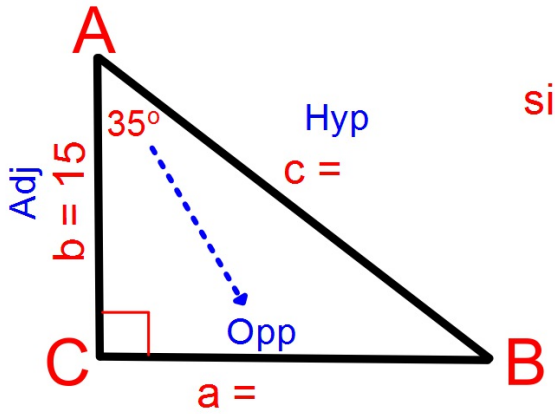
2. Using SOH-CAH-TOA
   Set up one of these trig functions and solve for the missing side/hypotenuse.

3. Use the Pythagorean Theorem to find the remaining missing side.

# Example

## Solve the given triangle, round all decimals to the nearest tenth:

1. $\angle A = 35^\circ$ & $b = 15$




**Finding the other 2 sides:**

*Set up SOH-CAH-TOA using A...*

$\sin 35^\circ = \frac{a}{c}$ $\cos 35^\circ = \frac{15}{c}$ $\tan 35^\circ = \frac{a}{15}$

*Since sin contains side a and c we will need to solve the other two for the two missing sides.*

$\frac{c \cdot \cos 35^\circ}{\cos 35^\circ} = \frac{15}{\cos 35^\circ}$ & $15 \cdot \tan 35^\circ = a$

$c = 18.3$ $a = 10.5$

**Finding the third angle:**

$\angle B = 180^\circ - 90^\circ - 35^\circ$

$\angle B = 55^\circ$

## Finding Angles Given Only Sides

Inverse Functions:

$\sin^{-1}A$
$\cos^{-1}A$
$\tan^{-1}A$

} Will require you to use the 2nd key and then press sin, cos, or tan

Finding the measure of the angle:

1. Set up the ratio of the sides using SOH-CAH-TOA
2. Then:
   $\sin^{-1}\left(\frac{\text{Opp}}{\text{Hyp}}\right) = A$, $\cos^{-1}\left(\frac{\text{Adj}}{\text{Hyp}}\right) = A$, $\tan^{-1}\left(\frac{\text{Opp}}{\text{Adj}}\right) = A$
3. Round off to the nearest tenth of a degree

# Solving Right Triangles:

## Given 2 sides

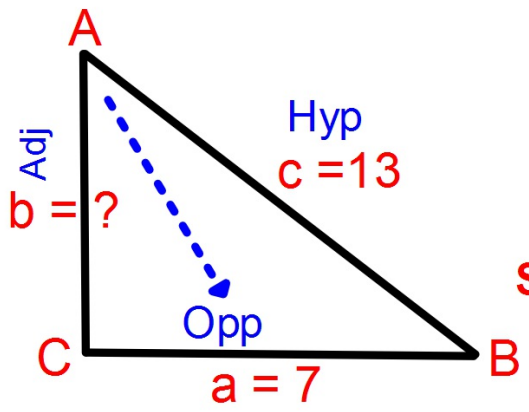
Procedure:

1. Find the third side of the triangle using Pythagorean Theorem.
2. Set up the regular trigonometic functions: SOH-CAH-TOA
3. Find one of the angles using the inverse functions discussed on the previous page.
4. Find the third angle by taking...
   90º - Angle found in step 3
   This is because one angle is already 90º

# Example

**Solve the given triangle, round all decimals to the nearest tenth:**

1. a = 7 & c = 13




**Find the third side using Pythagorean Theorem:**

$7^2 + b^2 = 13^2$

$49 + b^2 = 169$

$-49 \qquad -49$

$b^2 = 120$

$b = \sqrt{120}$

$b = \sqrt{4 \cdot 30}$

$\boxed{b = 2\sqrt{30}}$

**Select one angle to use, lets say A. We were given a and c, the Opposite and the Hypotenuse. So lets set up sin.**

$\sin A = 7/13$

$A = \sin^{-1}(7/13)$

$\boxed{\angle A \approx 32.6}$

**Finally,** $\boxed{\angle B = 180^\circ - 90^\circ - 32.6^\circ = 57.4^\circ}$