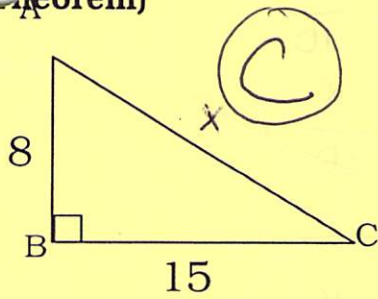


11-5b Finding Missing Side or Angle of Right Triangles

Scenario 1: Given 2 sides. Find Third Side in simplest radical form (Pythagorean Theorem)



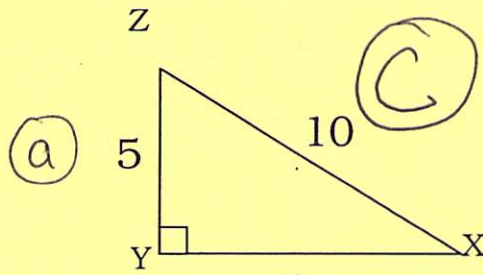
$$a^2 + b^2 = c^2$$

$$8^2 + 15^2 = c^2$$

$$64 + 225 = c^2$$

$$\sqrt{289} = \sqrt{c^2}$$

$$17 = c$$



$$a^2 + b^2 = c^2$$

$$5^2 + b^2 = 10^2$$

$$25 + b^2 = 100$$

$$\begin{array}{r} 25 + b^2 = 100 \\ -25 -25 \end{array}$$

$$\sqrt{b^2} = \sqrt{75}$$

$$b = 5\sqrt{3}$$

$$\sqrt{75}$$

$$\sqrt{25} \sqrt{3}$$

$$5\sqrt{3}$$

Today we will be using our knowledge of Trigonometry to find angles and sides of right triangles. We will be using the calculator to evaluate sin, cos, and tan, but before we do we must make sure our calculator is in the right **mode**.

URGENT: For this course you ALWAYS need to be in degree mode on your calculator!

Find the sin, cos, and tan buttons on your calculator and evaluate the following: Round to three decimal places.

1. $\tan 59^\circ = 1.664$

2. $\sin 75^\circ = .966$

3. $\sin 8^\circ = .139$

4. $\cos 13^\circ = .974$

5. $\sin 32^\circ = .530$

6. $\tan 67^\circ = 2.356$

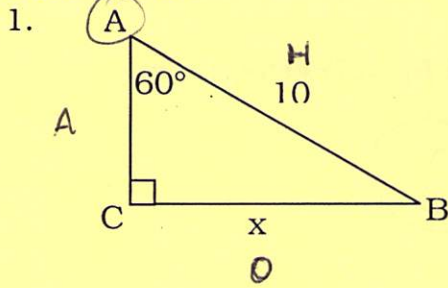
To find angles and sides of right triangles using trigonometry we will have to solve **Trigonometric Equations**.

Remember: SOH CAH TOA

determine which trig ratio will be the best choice to help you on a problem depends on the available information. **Label your triangle H, O, A!!**

* Never look at right \angle

Scenario 2:

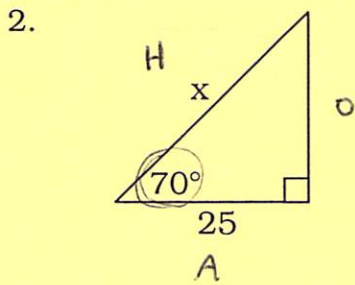


$\theta = x$
 ~~$x =$~~
 $H = 10$
 $\theta = 60^\circ$

$\sin \theta = \frac{O}{H}$
 $\sin 60^\circ = \frac{x}{10}$
 $10 \cdot 0.866 = \frac{x}{10} \cdot 10$

$8.66 = x$

Scenario 3:



~~$x =$~~
 $A = 25$
 $H = x$
 $\theta = 70^\circ$

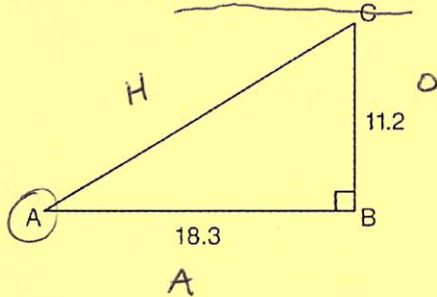
$\cos \theta = \frac{A}{H}$
 $\cos 70^\circ = \frac{25}{x}$
 $x \cdot 0.342 = \frac{25}{x} \cdot x$

$x = 73.1$

$\frac{0.342 x}{0.342} = \frac{25}{0.342}$

Scenario 4: Given 2 sides. Find an ANGLE (Trigonometry)

3. Find the measure of $\angle A$.



$O = 11.2$
 $A = 18.3$
 ~~$x =$~~
 $\theta = \angle A$

$\tan \theta = \frac{O}{A}$
 $x = \tan^{-1}(\tan \angle A) = \left(\frac{11.2}{18.3}\right) \tan^{-1}$

$\angle A = 31.5^\circ$

We solve Inverse Trig Equations the same way! Can you locate the inverse trig functions on your calculator? Try these. **Make sure you are in degree mode!**

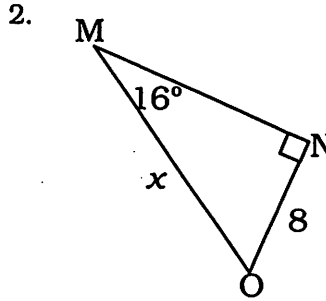
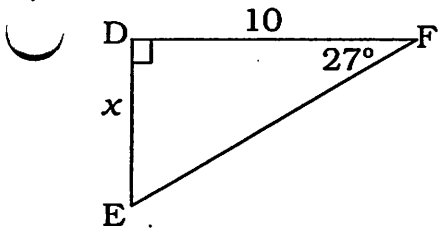
1. $\sin^{-1}\left(\frac{1}{2}\right) = 30^\circ$

2. $\tan^{-1}(\sqrt{3}) = 60^\circ$

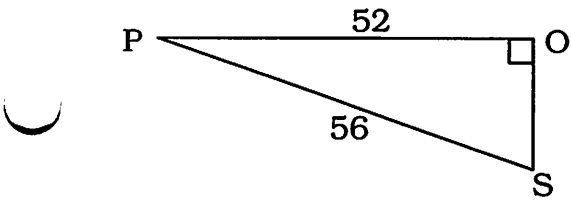
3. $\cos^{-1}\left(\frac{\sqrt{2}}{2}\right) = 45^\circ$

Practice 11-5b

Name _____



3. Find $\angle S$



4. In $\triangle JKL$, $\angle J$ is a right angle. If $JK = 12$ and $KL = 16$, find the $m\angle L$ to the nearest degree.

5. An 8-foot rope is tied from the top of a pole to a stake in the ground, as shown in the diagram below. If the rope forms a 57° angle with the ground, what is the height of the pole, to the nearest tenth of a foot?

