Module 5b: Inverse Trig Functions

Math Practice(s):

-Make sense of problems & persevere in solving them.

-Model with mathematics.

Learning Target(s):

-Understand the concept of inverse trig functions & use trig ratios to determine the measure of the acute angles in a right triangle.

Homework:

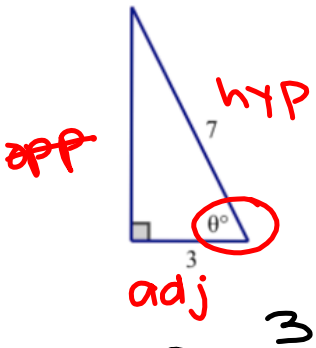
HW#6: 5b #1-6

Aug 8-12:20 PM

Warm-up $\sin = \frac{opp}{hyp}$ $\cos = \frac{adj}{hyp}$ $\tan = \frac{opp}{adj}$

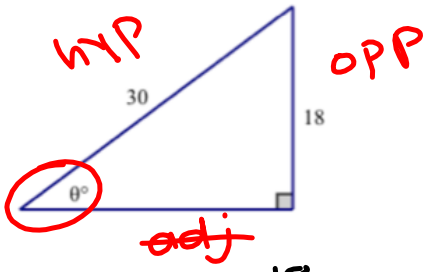
For each of the following right triangles, set up an equation involving a trig. ratio (sine, cosine or tangent) that could be used to determine the value of θ. You do not need to solve your equation; **simply set up an equation using a trig. ratio.**

1.



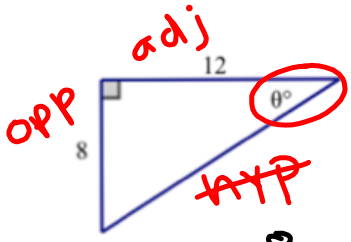
$\cos\theta = \frac{3}{7}$

2.



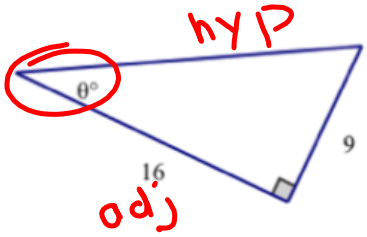
$\sin\theta = \frac{18}{30}$

3.



$\tan\theta = \frac{8}{12}$

4.



$\tan\theta = \frac{9}{16}$

(erase to show)

The Inverse Trig Functions (#VOC)

$\sin^{-1}(x)$ is inverse sine

$\cos^{-1}(x)$ is inverse cosine

$\tan^{-1}(x)$ is inverse tangent

- The ***inverse trig functions*** are used when we need to find the **MEASURE of an ANGLE.**
  - When we usually use a trig. function, we input an angle into the function and for the output, we get the ratio of 2 side lengths of a right triangle.
  - However, when we use an **inverse trig. function**, we know the ratio of 2 side lengths of a right triangle, and we want to determine the angle measure.
- The **inverse trig. functions** can be found on your calculator, located above the Sin, Cos and Tan buttons. They are usually activated by first pressing the **2nd** or **Shift** key.

Example 1: Use your calculator to determine the angle measure that will make each equation a true statement.

$\sin^{-1}(0.5) =$ 30 °	$\sin($ 30 °$) = 0.5$
$\tan^{-1}(0.364) =$ 20 °	$\tan($ 20 °$) = 0.364$
$\sin^{-1}\left(\frac{5}{12}\right) =$ 25 °	$\sin($ 25 °$) = \frac{5}{12}$
$\cos^{-1}(0.602) =$ 53 °	$\cos($ 53 °$) = 0.602$
$\tan^{-1}(1) =$ 45 °	$\tan($ 45 °$) = 1$
$\cos^{-1}\left(\frac{16}{35}\right) =$ 63 °	$\cos($ 63 °$) = \frac{16}{35}$

Oct 31-8:40 AM

Practice

5. Solve for the unknown value in each of the following trig equations. Round your answers to the nearest tenth.

A. $\cos\theta = \frac{4}{5}$

$\cos^{-1}\left(\frac{4}{5}\right) = \theta$

$\theta = 36.9°$

B. $\tan 75° = x$

$x = 3.7$

C. $\sin A = .1234$

$\sin^{-1}(0.1234) = A$

$A = 7.1°$

D. $\tan\theta = \frac{1}{2}$

$\tan^{-1}\left(\frac{1}{2}\right) = \theta$

$\theta = 26.6°$

E. $\sin\theta = \frac{1}{2}$

$\sin^{-1}\left(\frac{1}{2}\right) = \theta$

$\theta = 30°$

F. $\cos x = \frac{1}{\sqrt{2}}$

$\cos^{-1}\left(\frac{1}{\sqrt{2}}\right) = x$

$x = 45°$

G. $\sin 37° = x$

$x = 0.6$

H. $\cos\theta = \frac{96}{135}$

$\cos^{-1}\left(\frac{96}{135}\right) = \theta$

$\theta = 44.7°$

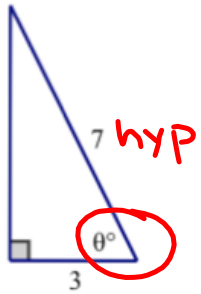
I. $\tan\theta = 2.1345$

$\tan^{-1}(2.1345) = \theta$

$\theta = 64.9°$

6. For each of the following right triangles, set up an equation involving a trig. ratio (sine, cosine or tangent) and solve it to determine the value of θ.

A.



~~opp~~ 7 hyp

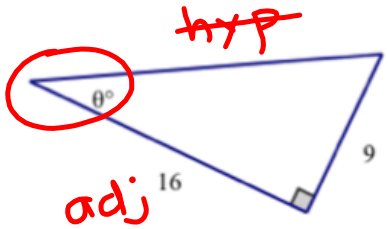
adj

$\cos\theta = \frac{3}{7}$

$\cos^{-1}\left(\frac{3}{7}\right) = \theta$

$\theta = 65°$

B.



~~hyp~~

opp

adj

$\tan\theta = \frac{9}{16}$

$\tan^{-1}\left(\frac{9}{16}\right) = \theta$

$\theta = 29°$