

4-3 day 2

## I. Fundamental Trig Identities

## Reciprocal

$$\begin{aligned}\sin \theta &= \frac{1}{\csc \theta} \\ \cos \theta &= \frac{1}{\sec \theta} \\ \tan \theta &= \frac{1}{\cot \theta}\end{aligned}$$

## Quotient

$$\begin{aligned}\tan \theta &= \frac{\sin \theta}{\cos \theta} \\ \cot \theta &= \frac{\cos \theta}{\sin \theta}\end{aligned}$$

## Pythagorean

$$\begin{aligned}\sin^2 \theta + \cos^2 \theta &= 1 \\ 1 + \tan^2 \theta &= \sec^2 \theta \\ 1 + \cot^2 \theta &= \csc^2 \theta\end{aligned}$$

II. Use the identities to transform one side of the equation into the other.

Ex 1)  $\cos \theta \sec \theta = 1$

$$\begin{aligned}\downarrow \\ \frac{1}{\sec \theta} \cdot \sec \theta &= 1 \\ 1 &= 1 \checkmark\end{aligned}$$

Ex 2)  $(\sec \theta + \tan \theta)(\sec \theta - \tan \theta) = 1$

$$\begin{aligned}\text{FOIL} \quad & -\tan \theta \sec \theta + \tan \theta \sec \theta \\ \sec^2 \theta - \tan^2 \theta &= 1 \\ \downarrow \\ 1 + \tan^2 \theta - \tan^2 \theta &= 1 \\ 1 &= 1 \checkmark\end{aligned}$$

III. Use your calculator to evaluate to 4 decimal places.

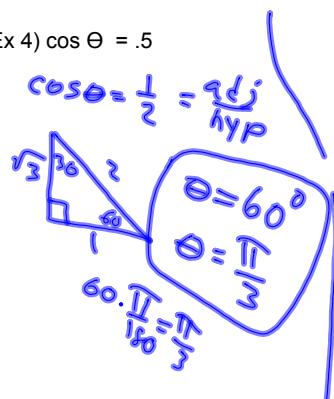
Ex 3)  $\sin 87^\circ = 0.9986$

$\tan \frac{11}{13} = 0.2465$

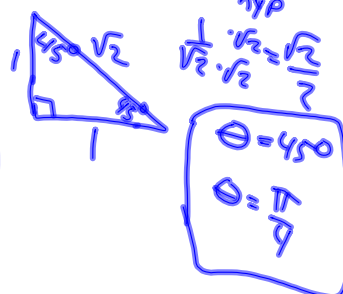
$$\begin{aligned}\sec 5^\circ &= \cos 5^\circ = 0.9961946981 \\ &= 1.0038\end{aligned}$$

IV. Find each value of  $\theta$  in degrees ( $0 < \theta < 90$ ) and radians ( $0 < \theta < \frac{\pi}{2}$ ) without a calculator..

Ex 4)  $\cos \theta = .5$

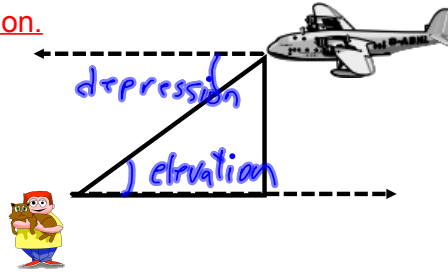


Ex 5)  $\cos \theta = \frac{\sqrt{2}}{2} = \frac{\text{adj}}{\text{hyp}}$

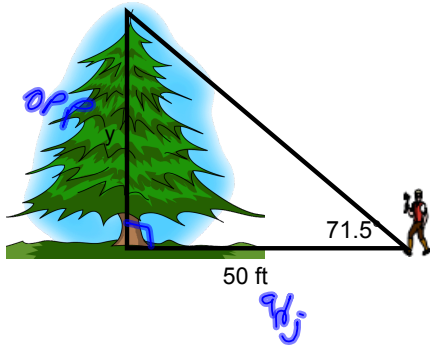


V. Story Problems:

Angle of depression versus angle of elevation.



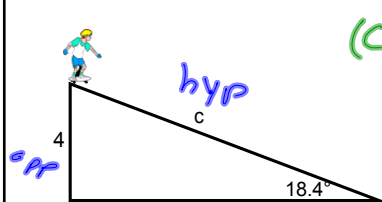
Ex 6) How tall is the tree?



$$50 \tan 71.5^\circ = \frac{Y}{50} \quad (50)$$

$$149.4 \text{ ft} = Y$$

Ex 7) Find the length of the ramp?



$$(c) \sin 18.4^\circ = \frac{4}{c} \quad (c)$$

$$\frac{c \sin 18.4^\circ}{\sin 18.4^\circ} = \frac{4}{\sin 18.4^\circ}$$

$$c = 12.7$$