

4.2 Trig Functions

#42

SohCahToa

$$\text{sine} = \frac{\text{opp}}{\text{hyp}}$$

$$\sin$$

$$\text{cosine} = \frac{\text{adj}}{\text{hyp}}$$

$$\cos$$

$$\text{tangent} = \frac{\text{opp}}{\text{adj}}$$

$$\tan$$

Reciprocals

$$\text{cosecant} = \frac{\text{hyp}}{\text{opp}}$$

$$\csc$$

$$\text{secant} = \frac{\text{hyp}}{\text{adj}}$$

$$\sec$$

$$\text{cotangent} = \frac{\text{adj}}{\text{opp}}$$

$$\cot$$

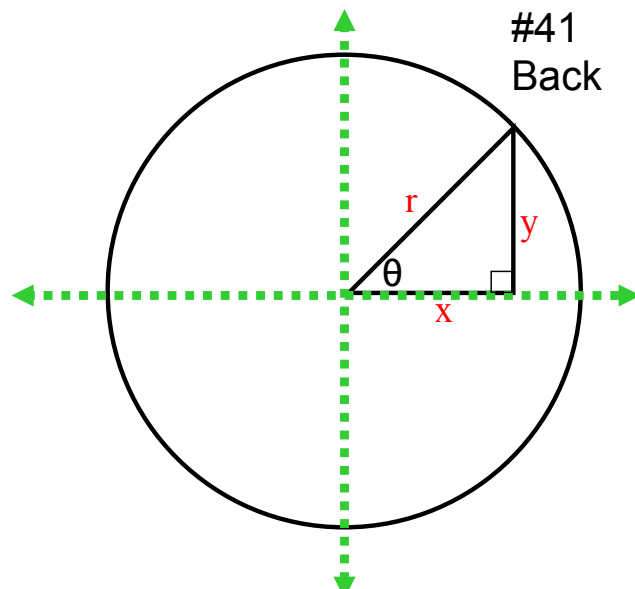


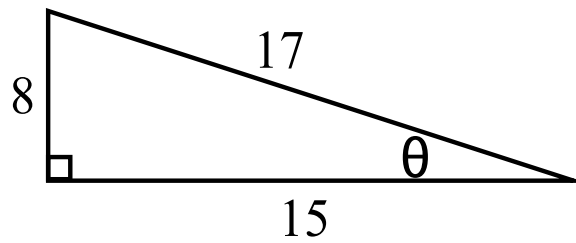
$$\sin \theta = \frac{\text{opp}}{\text{hyp}} = \frac{y}{r}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}} = \frac{x}{r}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}} = \frac{y}{x}$$

$$\sec \theta = \frac{\text{hyp}}{\text{adj}} = \frac{r}{x} \quad \csc \theta = \frac{\text{hyp}}{\text{opp}} = \frac{r}{y} \quad \cot \theta = \frac{\text{adj}}{\text{opp}} = \frac{x}{y}$$





Find all six trig ratios for the given triangle:

$$\sin \theta = \frac{8}{17}$$

$$\csc \theta = \frac{17}{8}$$

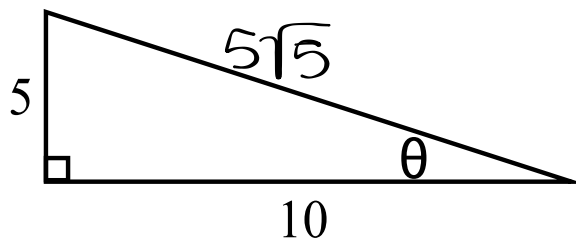
$$\cos \theta = \frac{15}{17}$$

$$\sec \theta = \frac{17}{15}$$

$$\tan \theta = \frac{8}{15}$$

$$\cot \theta = \frac{15}{8}$$

$$\begin{aligned} 5^2 + 10^2 &= c^2 \\ 125 &= c^2 \\ c &= \sqrt{125} = 5\sqrt{5} \end{aligned}$$



Find all six trig ratios for the given triangle:

$$\sin \theta = \frac{5}{5\sqrt{5}} = \frac{1}{\sqrt{5}}$$

$$\csc \theta = \frac{5\sqrt{5}}{5} = \sqrt{5}$$

$$\cos \theta = \frac{10}{5\sqrt{5}} = \frac{2}{\sqrt{5}}$$

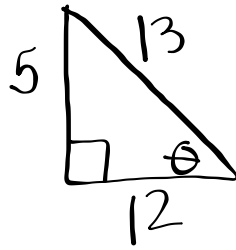
$$\sec \theta = \frac{5\sqrt{5}}{10} = \frac{\sqrt{5}}{2}$$

$$\tan \theta = \frac{5}{10} = \frac{1}{2}$$

$$\cot \theta = \frac{2}{1} = 2$$

Given the following trig function, find the remaining 5 functions:

$$\csc \theta = \frac{13}{5}$$



Work on 3-18 (remember every third)

Using your calculator, find:


$$\tan 8^\circ = .1405$$

$$\cot \frac{\pi}{12} = \frac{1}{\tan \frac{\pi}{12}} \approx 3.7$$

$$\cos 18.15^\circ = .9502$$

$$\tan 5.25 =$$

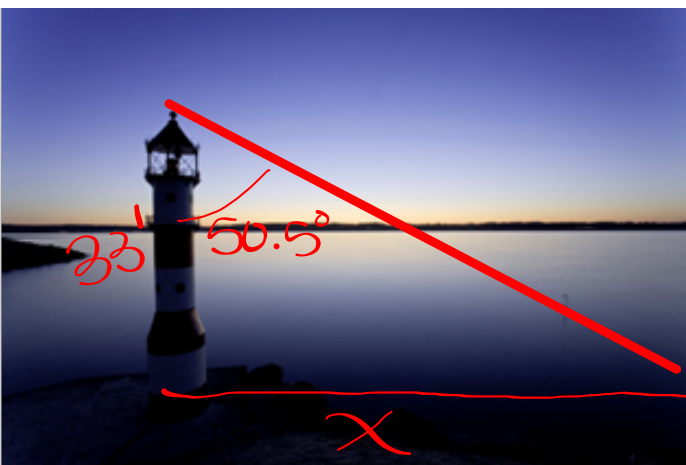
$$\sec \frac{\pi}{6} = 1.155$$



Standing 15' from a tree you must look up at 48° to see the top of the tree. How tall is the tree?

$$\tan 48^\circ = \frac{x}{15}$$

$$15 \tan 48^\circ = x$$

$$x \approx 16.69 \text{ ft}$$


A bird sitting on a 33' tower looks at a boat from an angle of depression of 50.5° . How far is the boat from the tower?

$$\tan 50.5^\circ = \frac{x}{33}$$

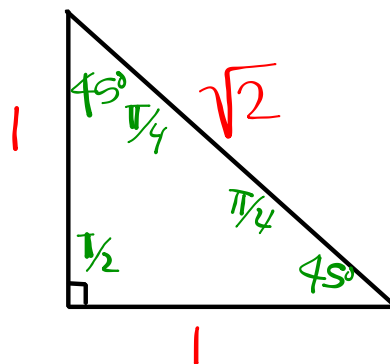
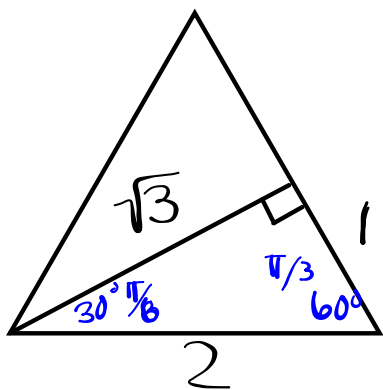
$$33 \tan 50.5^\circ = x$$

$$x \approx 40.03 \text{ ft}$$

Special Triangles

$$0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}$$

$$30^\circ, 45^\circ, 60^\circ, 90^\circ$$



Find the angle or value without a calculator:

$$\cot \frac{\pi}{3} = \frac{1}{\sqrt{3}}$$

$$\sin \theta = \frac{\sqrt{3}}{2} \quad \theta = 60^\circ, \frac{\pi}{3}$$



$$\sec \left(\frac{\pi}{6} \right) = \frac{2}{\sqrt{3}}$$

$$\cos \theta = \frac{1}{2} \quad \theta = 60^\circ, \frac{\pi}{3}$$

$$\sec \theta = 2 \quad \theta = 60^\circ$$

$$(\cos\theta, \sin\theta) \tan\theta$$

UNIT CIRCLE

