

4.2 Trigonometric Functions

Objective: I can calculate trig ratios using triangles.

Objective: I can remember special right triangles.

SohCahToa

sine $\rightarrow \sin \theta = \frac{\text{opp}}{\text{hyp}}$

cosine $\rightarrow \cos \theta = \frac{\text{adj}}{\text{hyp}}$

tangent $\rightarrow \tan \theta = \frac{\text{opp}}{\text{adj}}$

cosecant $\rightarrow \csc \theta = \frac{\text{hyp}}{\text{opp}}$

secant $\rightarrow \sec \theta = \frac{\text{hyp}}{\text{adj}}$

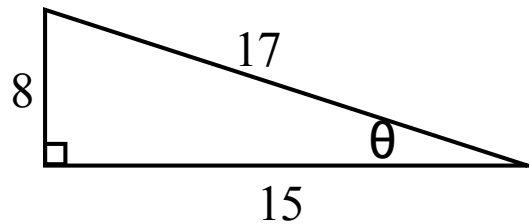
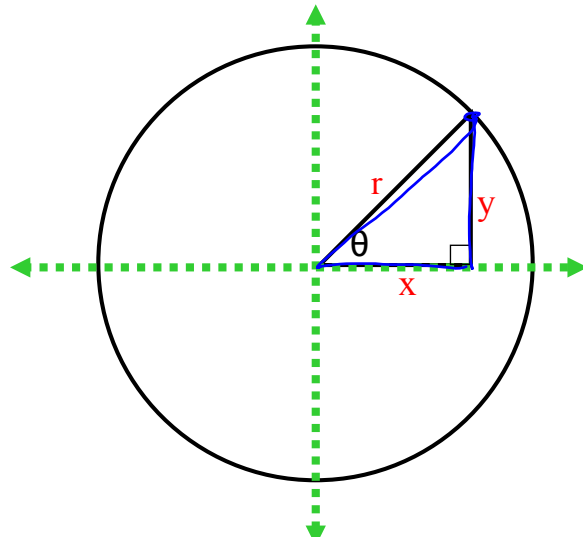
cotangent $\rightarrow \cot \theta = \frac{\text{adj}}{\text{opp}}$

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

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

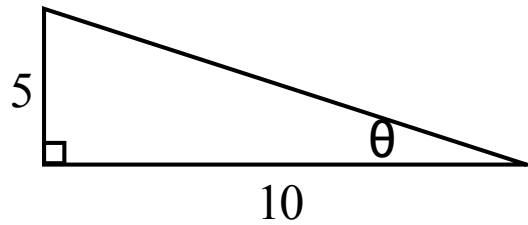
$$\tan \theta = \frac{\text{opp}}{\text{adj}} = \frac{y}{x}$$

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



Find all six trig ratios for the given triangle:

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



Find all six trig ratios for the given triangle:

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

$$\csc \theta = \frac{13}{5} \begin{array}{l} \rightarrow \text{hyp} \\ \rightarrow \text{opp} \end{array}$$

5 = opp

$$\begin{aligned} \sin \theta &= \frac{5}{13} \\ \cos \theta &= \frac{12}{13} & \sec \theta &= \frac{13}{12} \\ \tan \theta &= \frac{5}{12} & \cot \theta &= \frac{12}{5} \end{aligned}$$

$$\begin{aligned} 5^2 + b^2 &= 13^2 \\ b^2 &= 169 - 25 \\ b^2 &= 144 \\ b &= 12 \end{aligned}$$

Work on 3-18 (remember every third)

Using your calculator, find:

$$\tan 8^\circ =$$

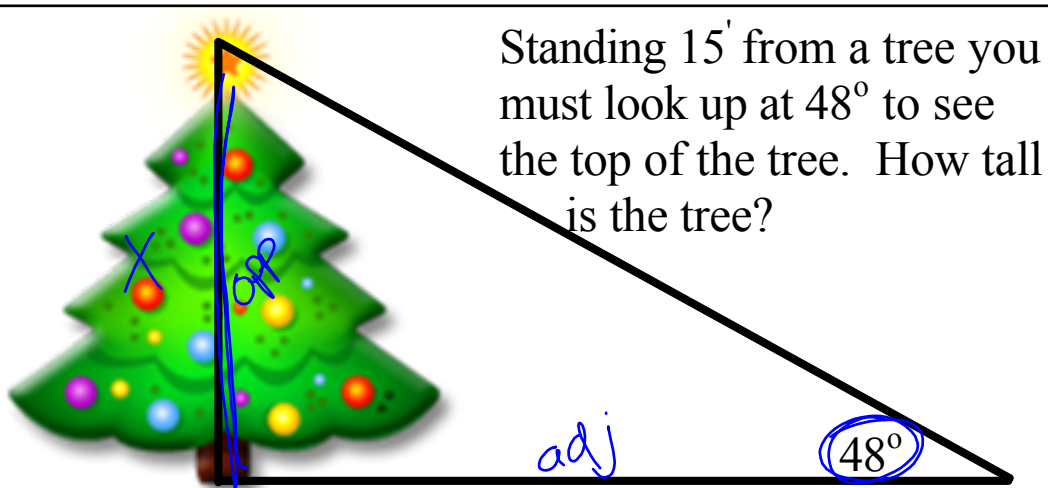
$$\cot \frac{\pi}{12} = \frac{1}{\tan \frac{\pi}{12}}$$

3.73

$$\cos 18.15^\circ =$$

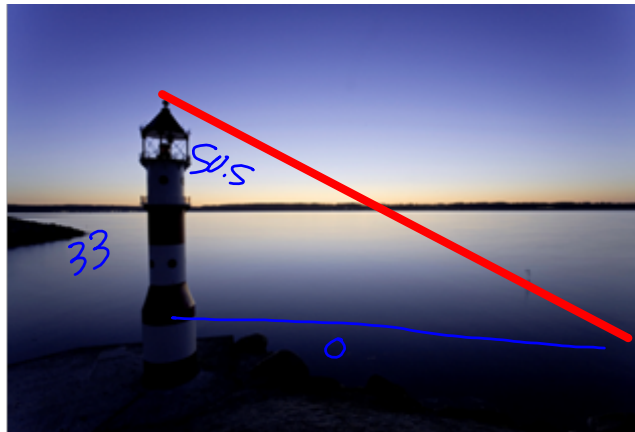
$$\tan 5.25 =$$

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

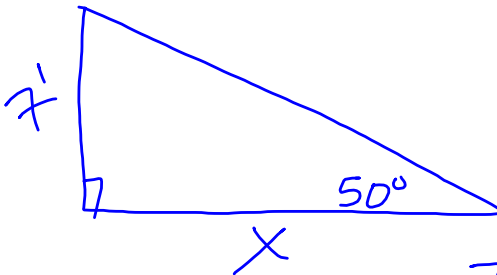


$$15 \cdot \tan 48^\circ = \frac{x}{15} \cdot 15$$

$$x = 16.66 \text{ ft}$$



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?

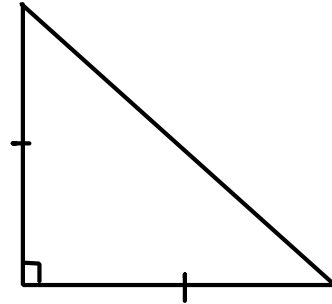
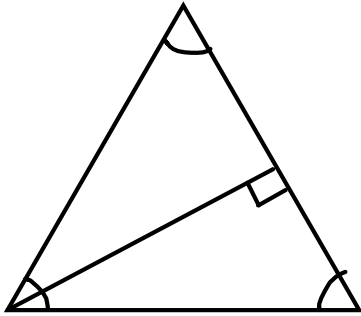


$$x \cdot \tan 50^\circ = \frac{7}{x}$$

$$\frac{x \tan 50^\circ}{\tan 50^\circ} = \frac{7}{\tan 50^\circ}$$

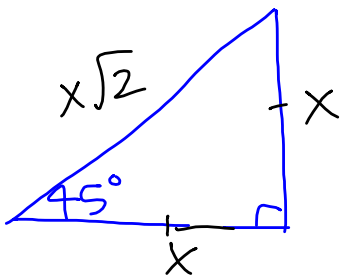
$$x = 5.87'$$

Special Triangles

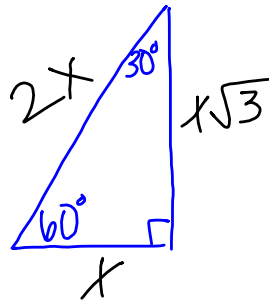


Special right triangles

45-45-90



30-60-90



Find the angle or value without a calculator:

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

$$\sin \theta = \frac{\sqrt{3}}{2}$$

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

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

$$\sec \theta = 2$$

