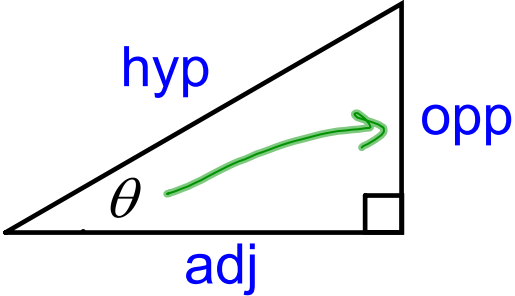


Chapter 4.3: Right Triangle Trig

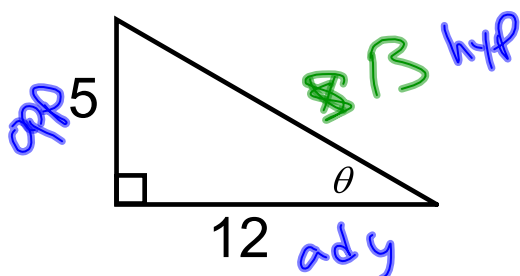
SOH-CAH-TOA

$$\sin \alpha = \frac{\text{opp}}{\text{hyp}} \quad \csc \alpha = \frac{\text{hyp}}{\text{opp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \sec \theta = \frac{\text{hyp}}{\text{adj}}$$

$$\tan \beta = \frac{\text{opp}}{\text{adj}} \quad \cot \beta = \frac{\text{adj}}{\text{opp}}$$


ex. Find the six trig functions of the triangle.



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

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

$$\cos \theta = \frac{12}{13}$$

$$\sec \theta = \frac{13}{12}$$

$$\tan \theta = \frac{5}{12}$$

$$\cot \theta = \frac{12}{5}$$

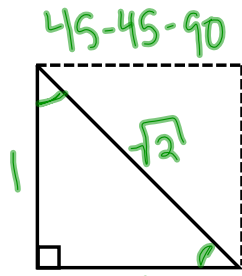
$$5^2 + 12^2 = x^2$$

$$25 + 144 = x^2$$

$$169 = x^2$$

$$x = 13$$

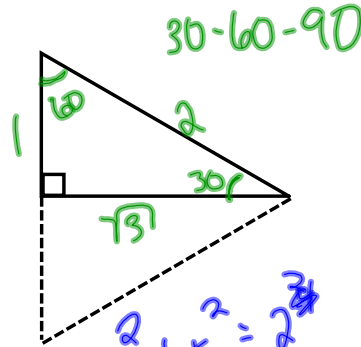
Special Right Triangles:



$$1^2 + 1^2 = x^2$$

$$2 = x^2$$

$$x = \sqrt{2}$$

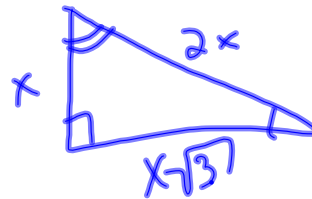
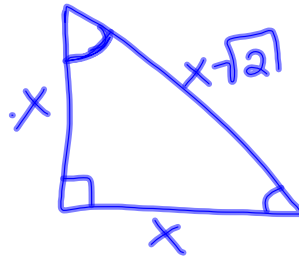


$$1^2 + x^2 = 2^2$$

$$1 + x^2 = 4$$

$$x^2 = 3$$

$$x = \sqrt{3}$$



$$\frac{\pi}{6}$$

$$\sin 30 = \frac{1}{2}$$

$$\cos 30 = \frac{\sqrt{3}}{2}$$

$$\tan 30 = \frac{\sqrt{3}}{3}$$

$$\frac{\pi}{3}$$

$$\sin 60 = \frac{\sqrt{3}}{2}$$

$$\cos 60 = \frac{1}{2}$$

$$\tan 60 = \sqrt{3}$$

$$\frac{\pi}{4}$$

$$\sin 45 = \frac{\sqrt{2}}{2}$$

$$\cos 45 = \frac{\sqrt{2}}{2}$$

$$\tan 45 = 1$$

Cofunction Identities:

$$\sin(\theta) = \cos(90 - \theta)$$

$$\cos(27) = \sin(63)$$

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

$$\tan \theta = \cot(90 - \theta)$$

$$\sec \theta = \csc(90 - \theta)$$

$$\frac{\pi}{2} - \frac{\pi}{3}$$

Find a cofunction with the same value as the given expression.

$$\sin 72^\circ$$

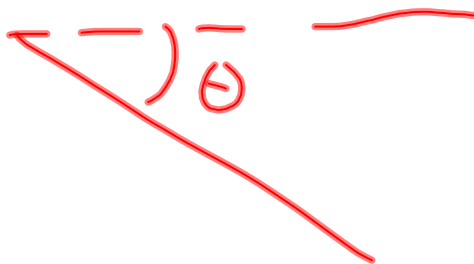
$$\csc \frac{\pi}{3}$$

Applications:

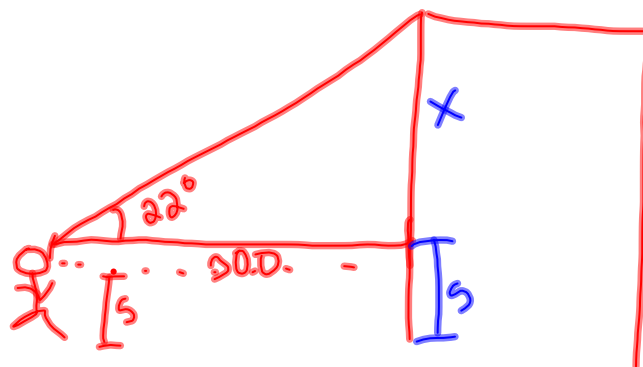
Angle of Elevation



Angle of Depression



Sighting the top of a building, a surveyor measured the angle of elevation to be 22 degrees. The transit is 5 feet above the ground and 300 feet from the building. Find the buildings height.



$$\tan(22) = \frac{x}{300}$$

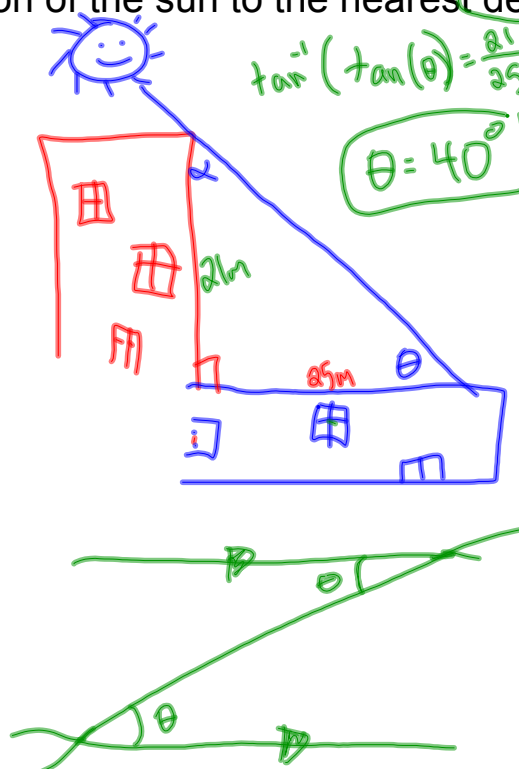
$$300 \tan(22) = x$$

$$x = 121.2$$

$$\frac{121.2}{+ 5}$$

126.2 ft

A building that is 21 meters tall casts a shadow 25 meters long. Find the angle of elevation of the sun to the nearest degree.



Suggested Problems: Ch 4.3 pg.461

#'s 5,9,15,21,31,35,41,43,45,47

