Warm Up

1. Name the hypotensuse.

$\overline{XZ}$

2. Name the leg opposite $\angle X$

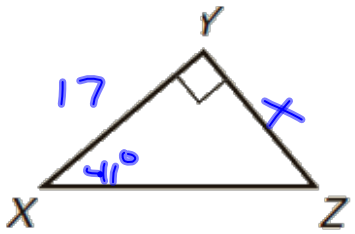
$\overline{YZ}$

3. Name the leg adjacent to $\angle X$

$\overline{XY}$

4. If $XY = 17$ and $m\angle X = 41°$ find YZ.

$\tan 41^\circ = \frac{x}{17}$ $x \approx 14.7$

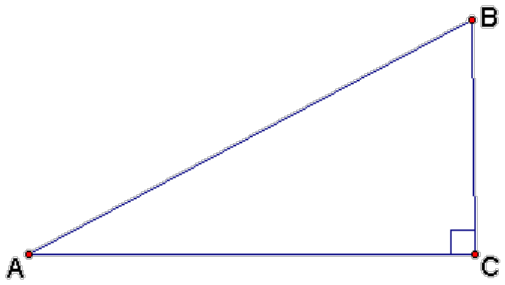


7-6 Sine and Cosine

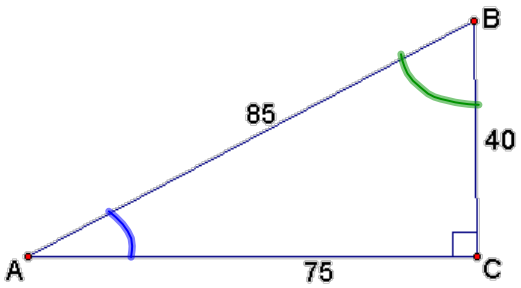
S ine
O pposite
H ypotenuse

C osine
A djacent
H ypotenuse

T angent
O pposite
A djacent



Ex 1 Find the following:



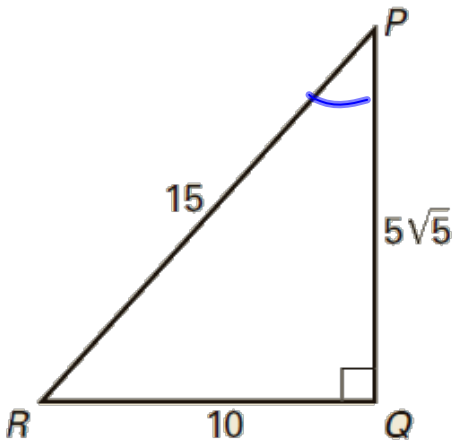
sin A $\frac{40}{85}$

cos A $\frac{75}{85}$

sin B $\frac{75}{85}$

cos B $\frac{40}{85}$

Ex. 2 Find the following:



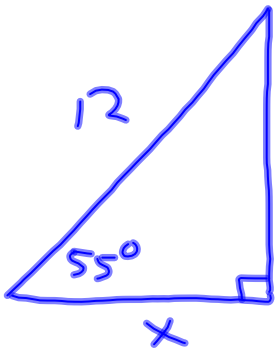
sin R $\frac{5\sqrt{5}}{15}$

cos R $\frac{10}{15}$

sin P $\frac{10}{15}$

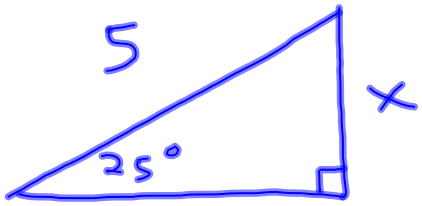
cos P $\frac{5\sqrt{5}}{15}$

Ex 3 A 12 foot long ladder is leaning on a building. The angle at the base of the ladder is 55 degrees. How far is the base from the building?



$\cos 55^\circ = \frac{x}{12}$ $x \approx 6.8$ ft.

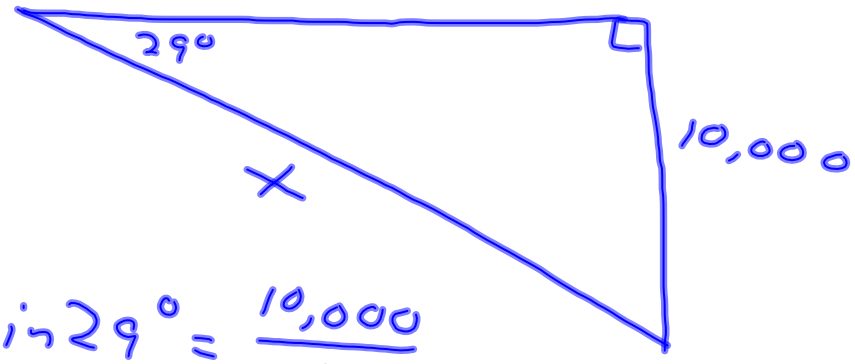
Ex 4 You are building a bike jump in your backyard, and you have a board that's 5 feet long. If you set the ramp up at a 25° angle , how tall will the ramp be?



$x \approx 2.1$ ft.

$\sin 25^\circ = \frac{x}{5}$

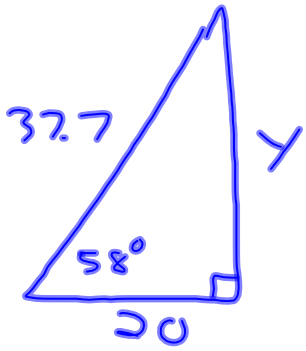
Ex 5 A pilot is looking at an airport from her plane. The angle of depression is 29 degrees. If the plane is at an altitude of 10,000 feet, how far is it from the airport?



$\sin 29^\circ = \frac{10{,}000}{x}$

$x = \frac{10{,}000}{\sin 29^\circ} \approx 20{,}626.6 \text{ ft.}$

Ex. 6 A rope, staked 20 feet from the base of a building, goes to the roof and forms an angle of 58° with the ground. How long is the rope? How tall is the building?



$\sin 58^\circ = \frac{y}{37.7}$

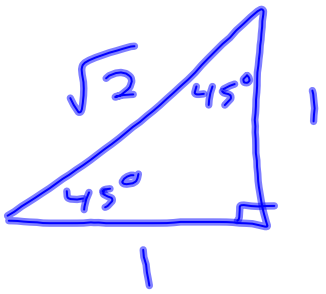
$y \approx 31.9 \text{ ft.}$

$\cos 58^\circ = \frac{20}{x}$

$x = \frac{20}{\cos 58^\circ}$

$x \approx 37.7 \text{ ft.}$

Ex. 7 Find the sine, cosine, and tangent of a 45° angle.

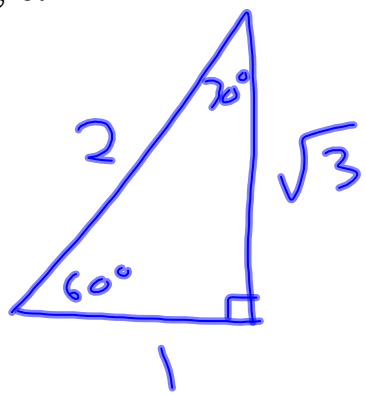


$\sin 45^\circ = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \approx .7$

$\cos 45^\circ = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \approx .7$

$\tan 45^\circ = 1$

Ex. 8 Find the sine, cosine, and tangent of a 30° angle and a 60° angle.



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

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

$\tan 60^\circ = \frac{\sqrt{3}}{1}$

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

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

$\tan 30^\circ = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$