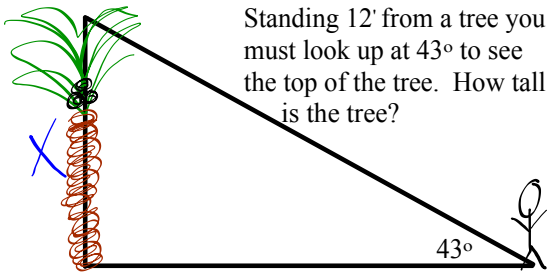
5-4

Contextual Trig

aka solving word problems

stop complaining....

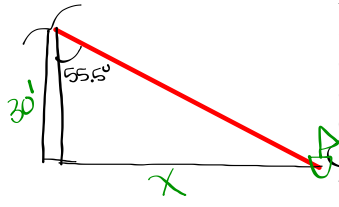


Standing 12' from a tree you must look up at 43° to see the top of the tree. How tall is the tree?

$\frac{12\tan 43}{12} = \frac{X}{12} \cdot 12$

$12\tan 43 = X$

$X = 11.19\text{ ft}$



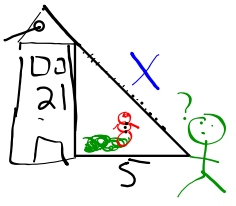
A bird sitting on a 30' tower looks at a boat from an angle of depression of 55.5°. How far is the boat from the tower?

$\tan 55.5 = \frac{X}{30}$

$30\tan 55.5 = X$

$X = 43.65\text{ ft}$

You want to hang up christmas lights on your house. There are bushes around your house, so the ladder has to be set up 5 feet away from your house. If your roof is 21 feet tall, to the nearest foot, how tall does your ladder need to be? Draw a diagram.



$21^2 + 5^2 = c^2$

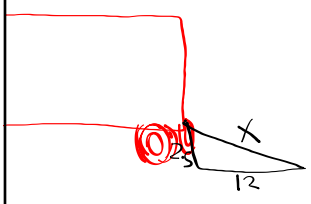
$441 + 25 = c^2$

$\sqrt{466} = \sqrt{c^2}$

$c = 21.587$

A moving truck is equipped with a ramp that extends from the back of the truck to the ground. When the ramp is fully extended, it touches the ground 12 feet from the back of the truck. The height of the ramp is 2.5 feet.

Draw a diagram then find the length of the ramp.



$2.5^2+12^2=c^2$

$6.25+144=c^2$

$\sqrt{150.25}=\sqrt{c^2}$

$12.258ft=c$

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

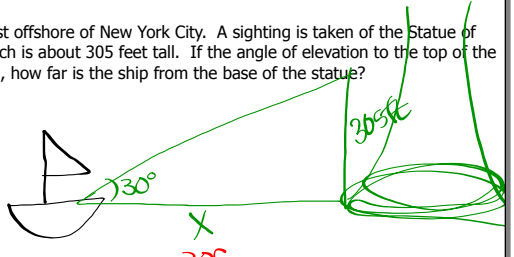
$\tan 48=\frac{x}{15}$

$15\tan 48=x$

$16.659ft$

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?

A ship is just offshore of New York City. A sighting is taken of the Statue of Liberty, which is about 305 feet tall. If the angle of elevation to the top of the statue is 30, how far is the ship from the base of the statue?

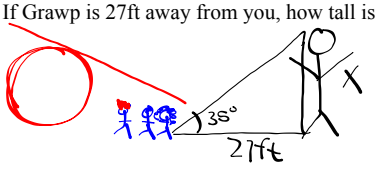


$\tan 30=\frac{305}{x}$

$\frac{305}{\tan 30}=\frac{x}{305}\,305$

$\frac{305}{\tan 30}=x=528.275ft$

You and your friends decide to sneak off one afternoon into the forbidden forest. You stumble into a clearing to avoid some star gazing centaurs and suddenly notice a large shadow, when you look up at an angle of 35, you see Grawp, Hagrid's giant brother. If Grawp is 27ft away from you, how tall is he?

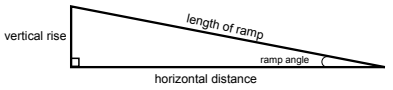


$\tan 35 = \frac{x}{27}$

$27 \tan 35 = x$

18.906ft

Ramps used for wheelchairs must have a ramp angle less than or equal to 8.33 degrees. The length of one ramp is 25 feet. The vertical rise is 18 inches. Estimate the ramp's horizontal distance and its ramp angle.



A sonar operator on a ship detects a submarine at a distance of 400 meters and an angle of 35 degrees? How deep is the submarine?