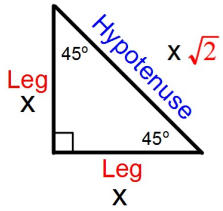
45° - 45° - 90° Triangle.



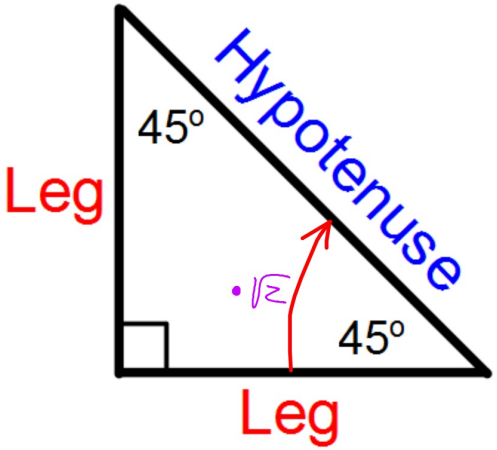
$$\text{Hypotenuse} = \text{Leg} \cdot \sqrt{2}$$

$$\text{Leg} = \frac{\text{Hypotenuse}}{\sqrt{2}}$$

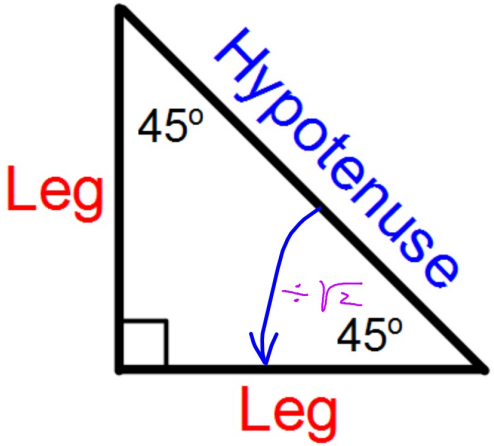
the only number used in a 45-45-90 triangle is:

$\sqrt{2}$

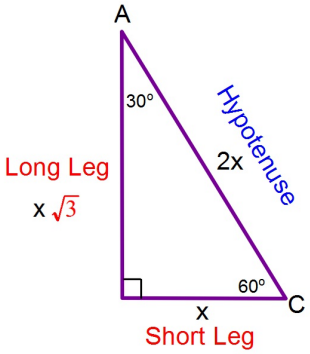
Moving from
Leg to Hypotenuse:



Moving from
Hypotenuse to Leg:



30° - 60° - 90° Triangle.



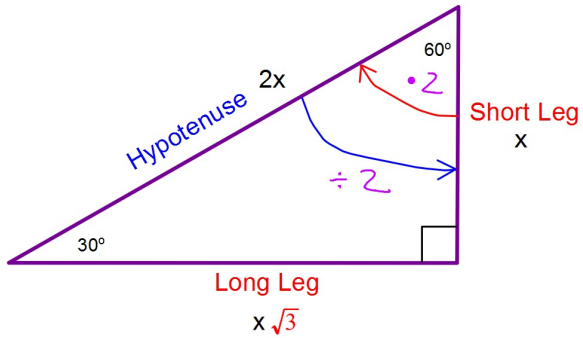
$$\text{Hypotenuse} = 2(\text{Short Leg})$$

$$\text{Short Leg} = \frac{1}{2}(\text{Hypotenuse})$$

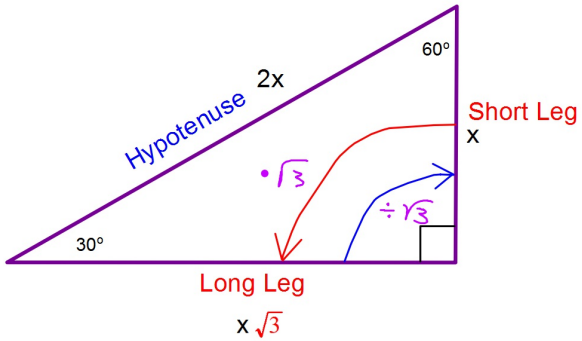
$$\text{Long Leg} = \sqrt{3}\,(\text{Short Leg})$$

$$\text{Short Leg} = (\text{Long Leg}) \div \sqrt{3}$$

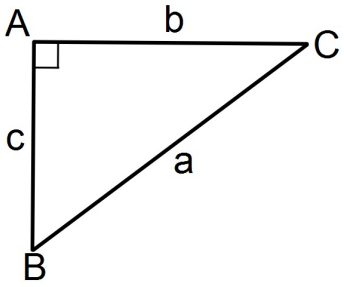
Moving between the Hypotenuse and Short Leg



Moving between the two legs



SOHCAHTOA



$\text{Sin}B = \dfrac{\text{Leg Opposite } \angle B}{\text{Hypotenuse}}$

$\text{Cos}B = \dfrac{\text{Leg Adjacent to } \angle B}{\text{Hypotenuse}}$

$\text{Tan}B = \dfrac{\text{Leg Opposite } \angle B}{\text{Leg Adjacent to } \angle B}$

Given △PQR, where ∠Q is the right angle.

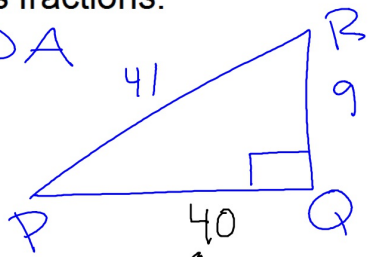
If $Sin\text{P} = \frac{9}{41}$, find the following as fractions:

SOHCAHTOA

$Cos\text{P} = \frac{40}{41}$ $\quad Tan\text{R} = \frac{40}{9}$

$Sin\text{R} = \frac{40}{41}$ $\quad Cos\text{R} = \frac{9}{41}$

$Tan\text{P} = \frac{9}{40}$



use pythagorean theorem to find this side:

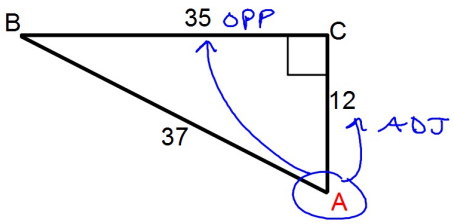
$x^2 + 9^2 = 41^2$

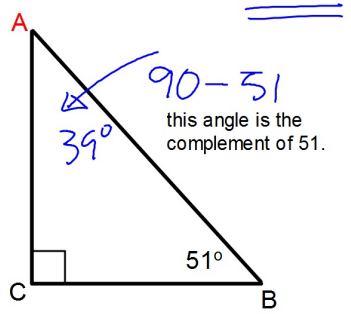
$x = \sqrt{41^2 - 9^2}$

$x = 40$

Find the TanA in each triangle.

SOHCAHTOA



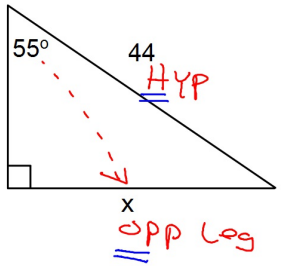


$\text{Tan}A = \frac{35}{12}$

$\text{Tan}A = \text{Tan}39° = 0.81$

Find the value of x to the nearest hundredth.

SOHCAHTOA



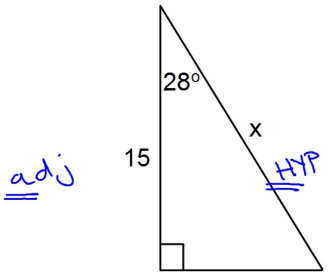
$\frac{\text{Sin}\,55°}{1} = \frac{x}{44}$

$x = 36.04$

this is reasonble because a leg must be less than the hypotenuse (36.04 < 44)

Find the value of x to the nearest hundredth.

SOHCAHTOA



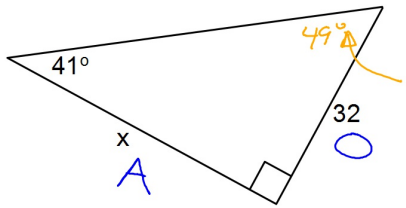
$\frac{\text{COS}(28)}{1} = \frac{15}{x}$

$x = 16.99$

this is reasonable because the hypotenuse must be larger than a leg (16.99 > 15)

Find the value of x to the nearest hundredth.

SOHCAHTOA

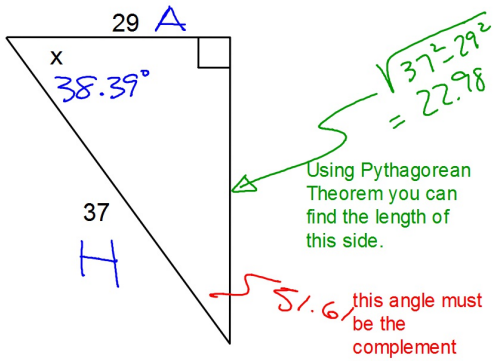


$\frac{\text{Tan}\,41°}{1} = \frac{32}{x}$

$x = 36.81$

this is reasonable because x is opposite the bigger angle and, therefore, it should be the bigger leg (36.81 > 32).

Find the value of x to the nearest hundredth. SOHCAHTOA



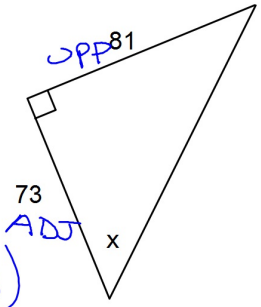
$\cos X = \frac{29}{37}$

$\cos^{-1}\left(\frac{29}{37}\right) = 38.39°$

Using Pythagorean Theorem you can find the length of this side.

this is reasonable because x is opposite the smaller leg and, therefore, should be the smaller angle (38.39 < 51.61)

Find the value of x to the nearest hundredth. SOHCAHTOA



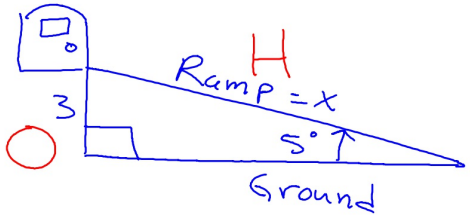
$\tan X = \frac{81}{73}$

$X = \tan^{-1}(81/73)$

$X = 47.97°$

Since angle x is opposite the bigger leg it must be the bigger angle which means it must be bigger than 45°.

Legally a wheelchair ramp can't exceed an incline of 5°. The door to a building is 3 feet above the level of the parking lot. How long of a board is need for the ramp if the angle it makes with the parking lot is 5°? Round to the nearest tenth.



SOHCAHTOA

$\frac{\sin 5°}{1} = \frac{3}{x}$

$x = 34.4'$