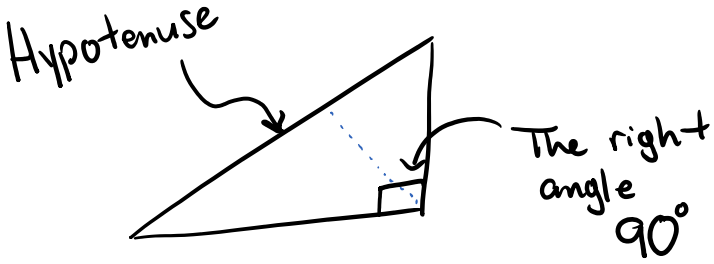
# 2.1 - The Tangent Ratio

October 18, 2019 8:34 AM

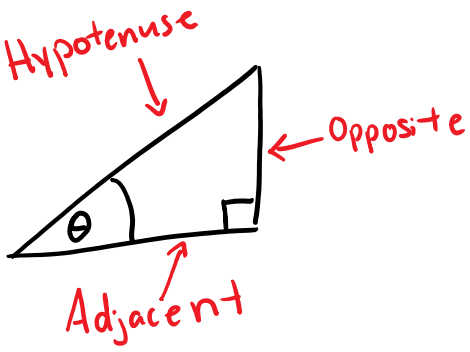
## Right Triangles:

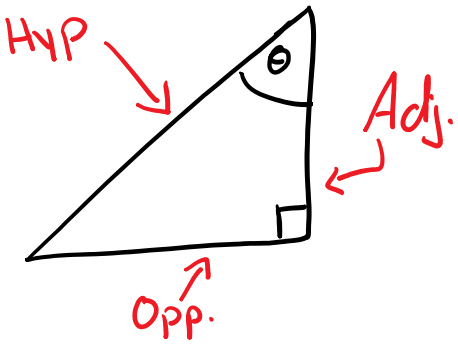



Depending on where the angle we're interested in is located, the 2 remaining sides are either called "opposite," or, "adjacent."

(the Greek letter "theta", $\theta$, is used to represent unknown angles)

ie.




The tangent (tan) of an angle "$\theta$" gives us

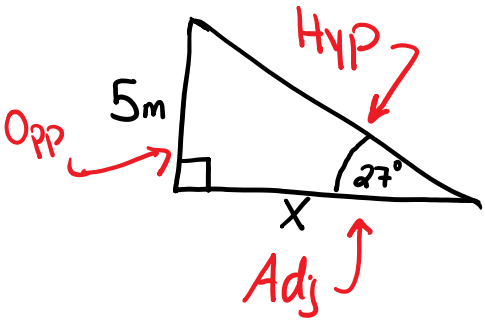
$$\frac{\text{length of opposite side}}{\text{length of adjacent side}},$$

ie. ★ $\tan\theta = \frac{opp}{adj}$ ★

also, to find $\theta$, we use "inverse tan" $\tan^{-1}$

ie. ★ $\theta = \tan^{-1}\left(\frac{opp}{adj}\right)$ ★

Ex: Calculate the length of "x".




$\Rightarrow \theta = 27°$

opp = 5m

Adj = x

$\Rightarrow \tan\theta = \frac{opp}{Adj}$

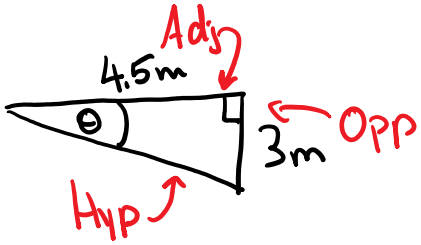
$\tan(27°) = \frac{(5m)}{x}$

$x\tan(27°) = 5m$

$x = \frac{5m}{\tan(27°)} = \frac{5m}{0.50952...}$

$\cong 9.81m$

Ex: Find angle $\theta$:




$\Rightarrow \theta = ?$

opp = 3m

Adj = 4.5m

$\Rightarrow \tan^{-1}[\tan\theta] = \tan^{-1}\left[\frac{opp}{Adj}\right]$

$\theta = \tan^{-1}\left(\frac{opp}{adj}\right)$

$\theta = \tan^{-1}\left[\frac{(3m)}{(4.5m)}\right]$

$\theta = 33.69°$

★ Very Important ★ !!!

Your calculator

must be in "DEGREE MODE".

Step 1: Find angle
Step 2: Label Triangle
Step 3: Set up $\tan\theta = \frac{Opp}{Adj}$
Step 4: Substitute your values
Step 5: Algebra to solve.

HW: Pg. 75 # 5, 8, 13 ← Finding Sides
Pg. 82 # 3-5, 10 ← Finding Angles