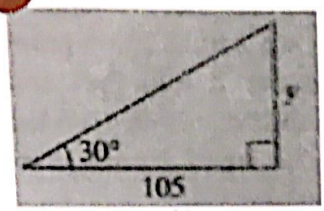
Baby Trig Review

Example 1: Solve for y



opp

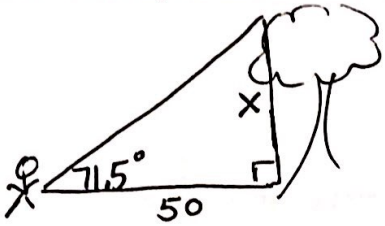
adj

$\tan 30° = \frac{y}{105}$

$y = 105 \cdot \tan 30°$

$y = 105 \cdot \frac{\sqrt{3}}{3} = 35\sqrt{3} \approx 60.6$

Example 2: A surveyor is standing 50 feet from the base of a large tree. The surveyor measures the angle of elevation to the top of the tree as 71.5°. How tall is the tree?

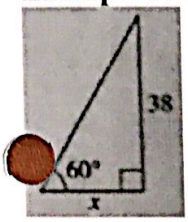


$\tan 71.5 = \frac{x}{50}$

$x = 149.4$ ft.

$x = 50 \cdot \tan 71.5° = 149.4$

Example 3: Solve for x

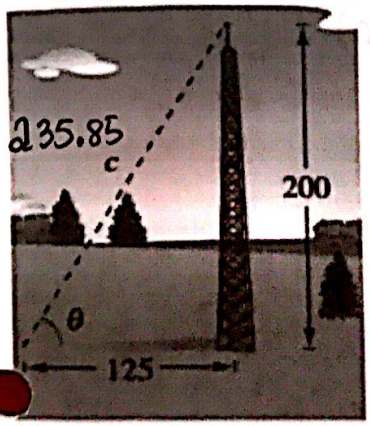


$\tan 60° = \frac{38}{x}$

$x = \frac{38}{\tan 60°} = \frac{38}{\sqrt{3}} = \frac{38\sqrt{3}}{3} \approx 21.9$

Example 4:

Length **A guy wire is stretched from a broadcasting tower at a point 200 feet above the ground to an anchor 125 feet from the base (see figure). How long is the wire?**



What is the angle the wire makes with the ground?

$\tan\theta = \frac{200}{125}$

$\tan\theta = 1.6$

$\theta = \tan^{-1}(1.6) \approx 58°$

D° M' S"

With calculators it is convenient to use decimal degrees to denote fractional parts of degrees were expressed in minutes and seconds, using prime (') and double prime ("). That is 1' = one minutes = $\frac{1}{60}(1°)$ and 1" = one second = $\frac{1}{3600}(1°)$. So an angle of 64 degrees, 32 minutes, and 47 seconds is represented by the notation θ = 64° 32' 47".

Example 3: Angle Measure to Decimal Degree Form
Convert the angle measure to decimal degree form. If necessary, round to the third decimal place.

(a) 64° 45'

$64 + \frac{45}{60} = 64.75°$

(b) -(408° 16' 25")

$-\left(408 + \frac{16}{60} + \frac{25}{3600}\right)$

$-408.274°$

Convert the Angle measure to D° M' S" (if necessary round seconds to 1st decimal place)

(c) 280.6°

$280° .6(60)$

$280°36'$

(d) – 115.8°

$-115° .8(60)$

$-115°48'$

d) 125.86°

$125° .86(60)$

$125°51.6'$

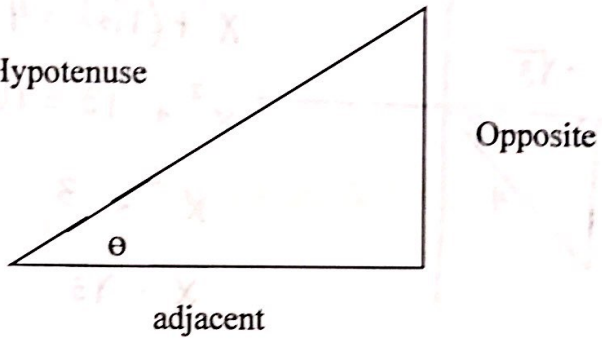
$125°51' .6(60)$

$125°51'36"$

Finding the Exact Values of the 6 Trig Functions

Find the Six Trignometric Functions:

- What are the 6 Trig Functions:
  a. Sine (Sin)
  b. Cosine (Cos)
  c. Tangent (Tan)
  d. Cosecant (Csc)
  e. Secant (Sec)
  f. Cotangent (Cot)



- What does each trig function mean in relation to a Right Triangle?

$\sin\theta = \frac{O}{H}$ $\quad \csc\theta = \frac{1}{\sin\theta}$; or $\frac{H}{O}$

$\cos\theta = \frac{A}{H}$ $\quad \sec\theta = \frac{1}{\cos\theta}$; or $\frac{H}{A}$

$\tan\theta = \frac{O}{A}$ $\quad \cot\theta = \frac{1}{\tan\theta}$; or $\frac{A}{O}$

- How do we find ALL SIX TRIG FUNCTIONS?

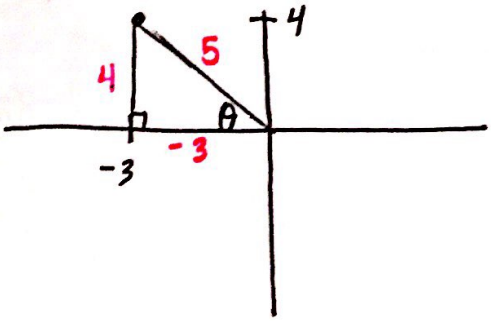
A. Take given information and plot it on the coordinate plane

B. Construct a right triangle (remember the opposite side always connects **hypotenuse and x-axis**)

C. Find the hypotenuse using the Pythagorean Theorem

D. Calculate all 6 trig functions

1. Given the point lies on the terminal side of an angle θ in standard position. Find the exact values of the six trig functions of θ (-3,4)

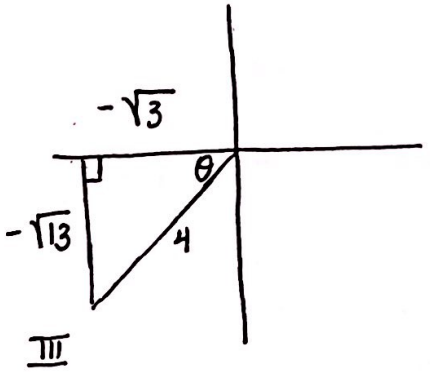


$\sin\theta = \frac{4}{5}$ $\quad \csc\theta = \frac{5}{4}$

$\cos\theta = \frac{-3}{5}$ $\quad \sec\theta = \frac{-5}{3}$

$\tan\theta = \frac{-4}{3}$ $\quad \cot\theta = \frac{-3}{4}$

2. Find the exact value of the remaining five trig function of θ. Quadrant III; $\sin\theta = \frac{-\sqrt{13}}{4}$. O H



$x^2 + (\sqrt{13})^2 = 4^2$

$x^2 + 13 = 16$

$x^2 = 3$

$x = \sqrt{3}$

$\sin\theta = \frac{-\sqrt{13}}{4}$ $\quad \csc\theta = \frac{-4\sqrt{13}}{13}$

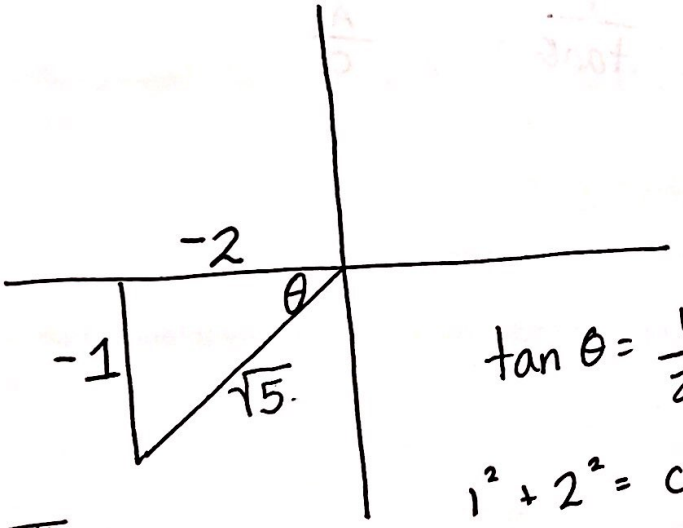
$\cos\theta = \frac{-\sqrt{3}}{4}$ $\quad \sec\theta = \frac{-4\sqrt{3}}{3}$

$\tan\theta = \frac{\sqrt{39}}{3}$ $\quad \cot\theta = \frac{\sqrt{39}}{13}$

$\frac{-\sqrt{13}}{-\sqrt{3}} = \frac{\sqrt{13}\cdot\sqrt{3}}{3} = \frac{\sqrt{39}}{3}$ $\quad \frac{3\sqrt{39}}{39} = \frac{\sqrt{39}}{13}$

3. Find the exact value of the remaining five trig function of θ. $\tan\theta = \frac{1}{2}$; $\sin\theta < 0$.

tan > 0 & sin < 0 in the 3rd Quad



$\tan\theta = \frac{1}{2}\left(\frac{\text{opp}}{\text{adj}}\right)$

$1^2 + 2^2 = c^2$

$5 = c^2$

$\sqrt{5} = c$

$\left(\frac{-1}{\sqrt{5}}\right)$ $\sin\theta = \frac{-\sqrt{5}}{5}$ $\quad \csc\theta = \frac{-\sqrt{5}}{1}\left(\frac{-5}{\sqrt{5}}\right)$

$\left(\frac{-2}{\sqrt{5}}\right)$ $\cos\theta = \frac{-2\sqrt{5}}{5}$ $\quad \sec\theta = \frac{-\sqrt{5}}{2}$

$\tan\theta = \frac{1}{2}$ $\quad \cot\theta = 2$