

Notes: Values of 6 Trig. Functions

Remember from Math II

SOH CAH TOA (Some Old Hippie
Came A Hoppin
Through Our Apartment)

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

$$\csc \theta = \frac{\text{hyp}}{\text{opp}}$$

$$\sec \theta = \frac{\text{hyp}}{\text{adj}}$$

$$\cot \theta = \frac{\text{adj}}{\text{opp}}$$

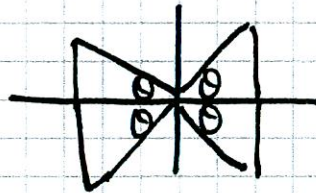
Flip the
Reciprocal
Identities

To find the 6 trig functions given an ordered pair

1.) graph the ordered pair

2.) Draw Right Δ (connect ordered pair to x-axis)

3.) Label the Δ

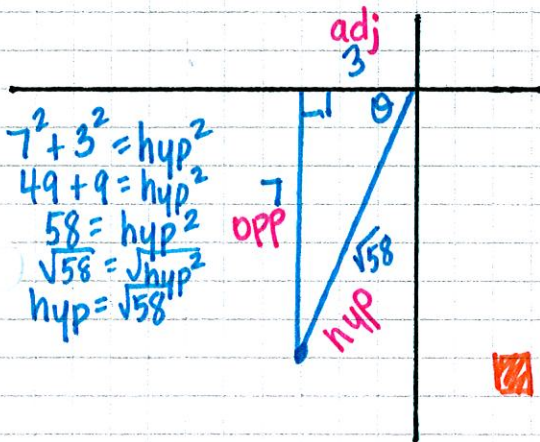


θ can only go
in these
spots

4.) Calculate hypotenuse

5.) Use soh cah toa to find values

Example 1 Find the 6 trig functions of θ . Given the Point $(-3, -7)$



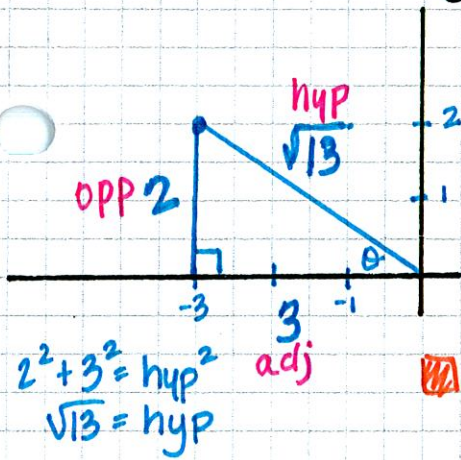
$$\sin \theta = \frac{-7}{\sqrt{58}} = \frac{-7\sqrt{58}}{58} \quad \csc \theta = \frac{-\sqrt{58}}{7}$$

$$\cos \theta = \frac{-3}{\sqrt{58}} = \frac{-3\sqrt{58}}{58} \quad \sec \theta = \frac{-\sqrt{58}}{3}$$

$$\tan \theta = \frac{7}{3} \quad \cot \theta = \frac{3}{7}$$

Don't forget your signs
You are in Q3 $(-\cos \theta, -\sin \theta)$
 $+\tan \theta$

Example 2 Now you try given $(-3, 2)$



$$\begin{aligned} \sin \theta &= \frac{2 \cdot \sqrt{13}}{\sqrt{13} \cdot \sqrt{13}} = \frac{2\sqrt{13}}{13} & \csc \theta &= \frac{\sqrt{13}}{2} \\ \cos \theta &= \frac{3 \cdot \sqrt{13}}{\sqrt{13} \cdot \sqrt{13}} = \frac{3\sqrt{13}}{13} & \sec \theta &= \frac{\sqrt{13}}{3} \\ \tan \theta &= \frac{2}{3} & \cot \theta &= \frac{3}{2} \end{aligned}$$

In quadrant II $(-\cos \theta, +\sin \theta)$
 $-\tan \theta$

Example 3 Find the 6 trig. values with the given info

Quad IV, $\csc \theta = -\frac{3}{1}$ $\sin \theta = -\frac{1}{3}$
 $(+\cos \theta, -\sin \theta)$, $-\tan \theta$

$$\begin{aligned} \text{opp}^2 + \text{adj}^2 &= \text{hyp}^2 \\ 1^2 + \text{adj}^2 &= 3^2 \\ 1 + \text{adj}^2 &= 9 \\ \text{adj}^2 &= \sqrt{8} \\ \text{adj} &= \sqrt{8} \\ \text{adj} &= 2\sqrt{2} \end{aligned}$$

$$\begin{aligned} \frac{o}{h} \sin \theta &= -\frac{1}{3} & \csc \theta &= -3 \\ \frac{a}{h} \cos \theta &= \frac{2\sqrt{2}}{3} & \sec \theta &= \frac{3\sqrt{2}}{2\sqrt{2}\sqrt{2}} = \frac{3\sqrt{2}}{4} \\ \frac{o}{a} \tan \theta &= \frac{1\sqrt{2}}{2\sqrt{2}\sqrt{2}} = \frac{\sqrt{2}}{4} & \cot \theta &= -\frac{2\sqrt{2}}{1} \end{aligned}$$

Example 4 Try Again

Quad II, $\tan \theta = \frac{5}{4}$
 $(-\cos \theta, +\sin \theta)$, $+\tan \theta$

$$\begin{aligned} 5^2 + 4^2 &= \text{hyp}^2 \\ \sqrt{41} &= \text{hyp} \end{aligned}$$

$$\begin{aligned} \sin \theta &= \frac{5\sqrt{41}}{\sqrt{41}\sqrt{41}} = \frac{5\sqrt{41}}{41} & \csc \theta &= \frac{\sqrt{41}}{5} \\ \cos \theta &= -\frac{4\sqrt{41}}{\sqrt{41}\sqrt{41}} = -\frac{4\sqrt{41}}{41} & \sec \theta &= -\frac{\sqrt{41}}{4} \\ \tan \theta &= \frac{5}{4} & \cot \theta &= \frac{4}{5} \end{aligned}$$

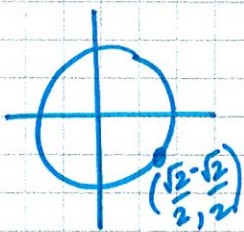
Example 5 Find the 6 trig values given a location on the unit circle

$$\theta = -45^\circ = 315^\circ$$

Quad III

(+cos, -sin)

-tan



$$\sin \theta = -\frac{\sqrt{2}}{2}$$

$$\cos \theta = \frac{\sqrt{2}}{2}$$

$$\tan \theta = -1$$

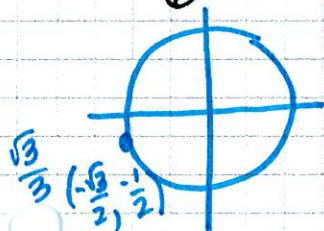
$$\csc \theta = \frac{2\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{2\sqrt{2}}{2} = \sqrt{2}$$

$$\sec \theta = \frac{2\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{2\sqrt{2}}{2} = \sqrt{2}$$

$$\cot \theta = -1$$

Example 6 TRY AGAIN

$$\theta = \frac{7\pi}{6}$$



Quad III (-cos, -sin)

+tan

$$\sin \theta = -\frac{1}{2}$$

$$\cos \theta = -\frac{\sqrt{3}}{2}$$

$$\tan \theta = \frac{\sqrt{3}}{3}$$

$$\csc \theta = -\frac{2}{1} = -2$$

$$\sec \theta = -\frac{2\sqrt{3}}{\sqrt{3}\sqrt{3}} = -\frac{2\sqrt{3}}{3}$$

$$\cot \theta = \frac{3\sqrt{3}}{\sqrt{3}\sqrt{3}} = \frac{3\sqrt{3}}{3} = \sqrt{3}$$

Your homework is out of the book.