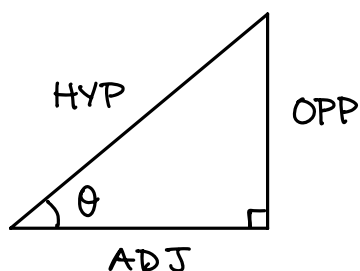


Right Triangle Trigonometry

For $0 < \theta < \pi/2$,



$$\sin \theta = \frac{\text{OPP}}{\text{HYP}}$$

$$\cos \theta = \frac{\text{ADJ}}{\text{HYP}}$$

$$\tan \theta = \frac{\text{OPP}}{\text{ADJ}}$$

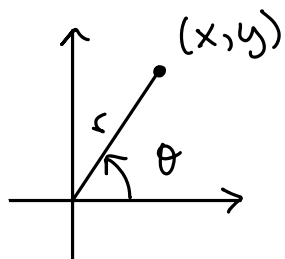
} SOH-CAH-TOA

Reciprocals: $\csc \theta = 1/\sin \theta = \text{HYP}/\text{OPP}$

$$\sec \theta = 1/\cos \theta = \text{HYP}/\text{ADJ}$$

$$\cot \theta = 1/\tan \theta = \text{ADJ}/\text{OPP}$$

Circular Trigonometry

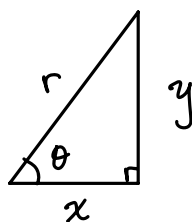


$$\sin \theta = y/r$$

$$\cos \theta = x/r$$

$$\tan \theta = y/x$$

Quad I: $0 < \theta < \pi/2$

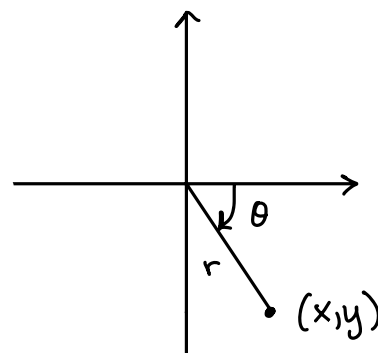
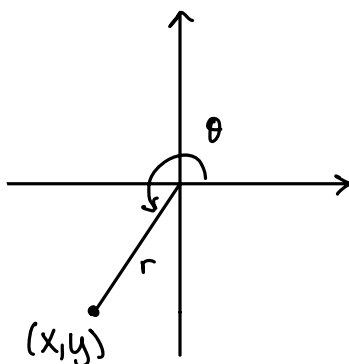
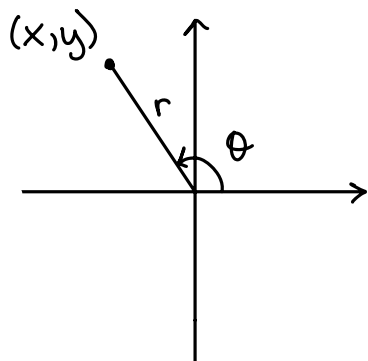


SOH-CAH-TOA ✓

Quad II: $\pi/2 < \theta < \pi$

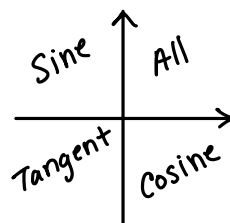
Quad III: $\pi < \theta < 3\pi/2$

Quad IV: $-\pi/2 < \theta < 0$

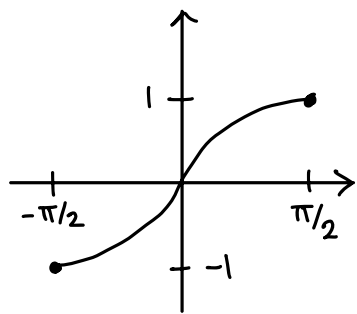


"All Students Take Calculus"

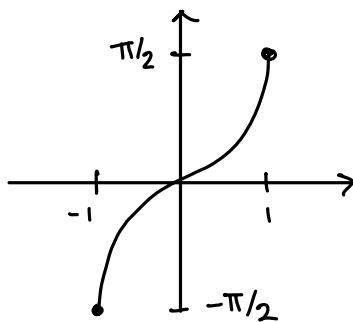
(which trig. fn. is pos. in which quad.)



Inverse Trig Fcns



Restricted Sine



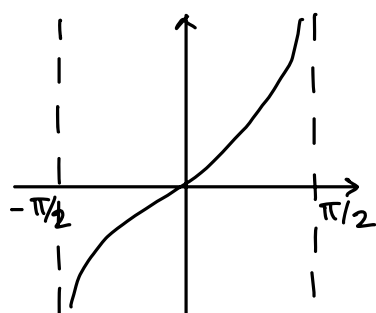
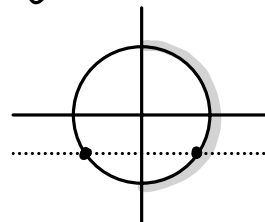
Arcsine (Inverse Sine)

For $-\pi/2 \leq \theta \leq \pi/2$,

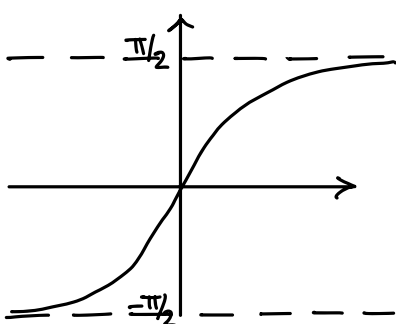
$$y = \sin \theta \Leftrightarrow \sin^{-1} y = \theta$$

$$\sin^{-1}(1/2) = \pi/6$$

$$(\sin(\pi/6) = 1/2)$$



Restricted Tangent



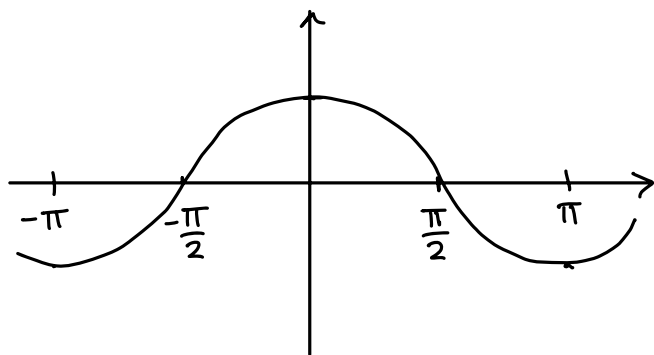
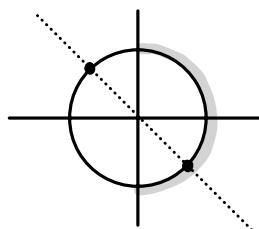
Arctangent (Inv. Tan.)

For $-\pi/2 < \theta < \pi/2$

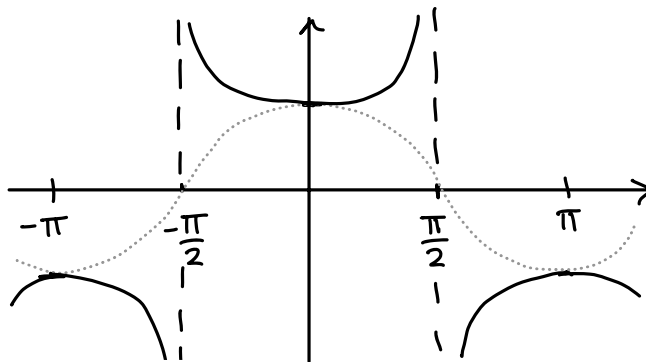
$$m = \tan \theta \Leftrightarrow \tan^{-1} m = \theta$$

$$\tan^{-1}(-1) = -\pi/4$$

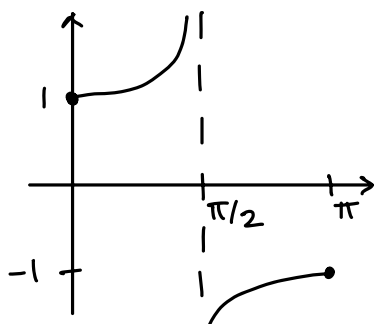
$$(\tan(-\pi/4) = -1)$$



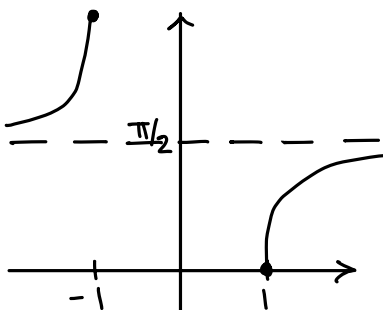
Cosine



Secant



Restricted Secant



Arcsecant (Inv. Sec.)

For $0 \leq \theta \leq \pi$ (but $\theta \neq \pi/2$)

$$s = \sec \theta \Leftrightarrow \sec^{-1} s = \theta$$

$$\sec^{-1}(-2) = 2\pi/3$$

$$(\sec 2\pi/3 = -2)$$

$$(\cos 2\pi/3 = -1/2)$$

