

# Trigonometric & Reciprocal Identities Notes

4.15.14

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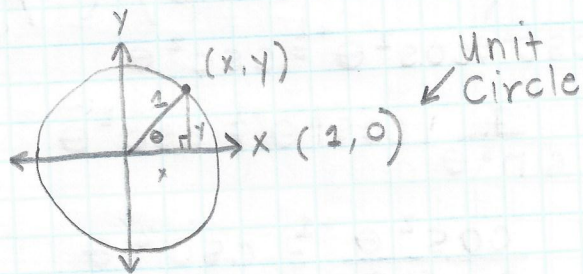
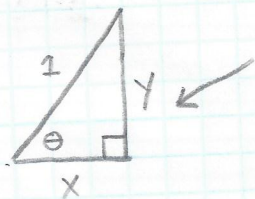
Reciprocal Functions:  $\csc \theta = \frac{1}{\sin \theta} \rightarrow \sin \theta = \frac{1}{\csc \theta}$

$\sec \theta = \frac{1}{\cos \theta} \rightarrow \cos \theta = \frac{1}{\sec \theta}$

$\cot \theta = \frac{1}{\tan \theta} \rightarrow \tan \theta = \frac{1}{\cot \theta}$

1<sup>st</sup> Pythagorean Identity:

$\sec \theta = \frac{1}{\cos \theta}$



$\cos \theta = x$

$\sin \theta = y$

$x^2 + y^2 = 1^2$

equal equations  $\rightarrow (\cos \theta)^2 + (\sin \theta)^2 = 1$   
 $\cos^2 \theta + \sin^2 \theta = 1$  (Identity 1)

2<sup>nd</sup> Pythagorean Identity:

(1<sup>st</sup>)  $\cos^2 \theta + \sin^2 \theta = 1$

$\left(\frac{1}{\sec \theta}\right)^2 + \sin^2 \theta = 1$

$\sec^2 \theta \left(\frac{1}{\sec^2 \theta} + \sin^2 \theta\right) = (1) \sec^2 \theta$

$1 + \sec^2 \theta \sin^2 \theta = \sec^2 \theta$

$1 + \frac{1}{\cos^2 \theta} \cdot \sin^2 \theta = \sec^2 \theta$

$1 + \frac{\sin^2 \theta}{\cos^2 \theta} = \sec^2 \theta$

$\tan \theta = \frac{\sin \theta}{\cos \theta}$

$1 + \tan^2 \theta = \sec^2 \theta$

(Identity 2)

inverse  $\frac{1}{\sec \theta} = \cos \theta$