

# Fundamental Trigonometric Identities

## 14-3

Fundamental Trigonometric Identities			
Reciprocal Identities	Tangent and Cotangent Ratio Identities	Pythagorean Identities	Negative-Angle Identities
$\csc \theta = \frac{1}{\sin \theta}$	$\tan \theta = \frac{\sin \theta}{\cos \theta}$	$\cos^2 \theta + \sin^2 \theta = 1$	$\sin(-\theta) = -\sin \theta$
$\sec \theta = \frac{1}{\cos \theta}$	$\cot \theta = \frac{\cos \theta}{\sin \theta}$	$1 + \tan^2 \theta = \sec^2 \theta$	$\cos(-\theta) = \cos \theta$
$\cot \theta = \frac{1}{\tan \theta}$		$\cot^2 \theta + 1 = \csc^2 \theta$	$\tan(-\theta) = -\tan \theta$

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I do:

Prove  $\sec \theta = \csc \theta \tan \theta$

$\sec \theta = \csc \theta \tan \theta$	<b>Given(changing right side)</b>
$\sec \theta = \frac{1}{\sin \theta} \left( \frac{\sin \theta}{\cos \theta} \right)$	<b>Reciprocal and ratio identities</b>
$\sec \theta = \frac{\sin \theta}{\sin \theta \cos \theta}$	<b>Multiply</b>
$\sec \theta = \frac{1}{\cos \theta}$	<b>Simplify</b>
$\sec \theta = \sec \theta$	<b>Reciprocal identity</b>

I Do:

Prove  $\csc(-\theta) = -\csc\theta$

$\csc(-\theta) = -\csc\theta$	Given (changing left side)
$\frac{1}{\sin(-\theta)} = -\csc\theta$	Reciprocal Identity
$\frac{1}{-\sin\theta} = -\csc\theta$	Negative angle identity
$-\left(\frac{1}{\sin\theta}\right) = -\csc\theta$	Factor out -1
$-\csc\theta = -\csc\theta$	Reciprocal identity

We Do:

Prove:  $1 - \sec(-\theta) = 1 - \sec\theta$

$1 - \sec(-\theta) = 1 - \sec\theta$	
$1 - \frac{1}{\cos(-\theta)} = 1 - \sec\theta$	

You Do in your notes:

Prove  $\sin\theta\cot\theta = \cos\theta$

$\sin\theta\cot\theta = \cos\theta$	

I Do:

Rewrite each expression in terms of  $\cos\theta$ .

$$\frac{\sin^2\theta}{1 - \cos\theta}$$

$\frac{\sin^2\theta}{1 - \cos\theta}$	Given
$\frac{1 - \cos^2\theta}{1 - \cos\theta}$	Pythagorean Identity
$\frac{(1 + \cos\theta)(1 - \cos\theta)}{1 - \cos\theta}$	Factor by difference of two squares
$\frac{(1 + \cos\theta)\cancel{(1 - \cos\theta)}}{\cancel{1 - \cos\theta}}$ $1 + \cos\theta$	Simplify



You Try:  
Rewrite in terms of  $\sin\theta$   
 $\cot^2 \theta$

Closure: What are 4 of the fundamental trigonometric Identities that we learned about today?