

Recall the following fundamental trigonometric identities.

### Complement Formulas

$$\sin\left(\frac{\pi}{2} - x\right) = \cos x$$

$$\cos\left(\frac{\pi}{2} - x\right) = \sin x$$

$$\tan\left(\frac{\pi}{2} - x\right) = \cot x$$

$$\cot\left(\frac{\pi}{2} - x\right) = \tan x$$

$$\sec\left(\frac{\pi}{2} - x\right) = \csc x$$

$$\csc\left(\frac{\pi}{2} - x\right) = \sec x$$

### Even vs Odd Trig Functions

$\sin(-x) = -\sin x$	Sine is an Odd Function.
$\cos(-x) = \cos x$	Cosine is an Even Function.
$\tan(-x) = -\tan x$	Tangent is an Odd Function.
$\cot(-x) = -\cot x$	Cotangent is an Odd Function.
$\sec(-x) = \sec x$	Secant is an Even Function.
$\csc(-x) = -\csc x$	Cosecant is an Odd Function.

### Quotient & Reciprocal Identities

$$\sin x / \cos x = \tan x$$

$$\cos x / \sin x = \cot x$$

$$1 / \sec x = \cos x$$

$$1 / \csc x = \sin x$$

$$1 / \tan x = \cot x$$

### Pythagorean Trigonometric Identities

$$\sin^2 x + \cos^2 x = 1$$

$$1 - \sin^2 x = \cos^2 x$$

$$1 - \cos^2 x = \sin^2 x$$

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

$$\cot^2 x + 1 = \csc^2 x$$

No Calculator

Use the fundamental identities to simplify the expressions.

1.  $\cot x \sin x$

2.  $\cos B \tan B$

3.  $\sin \theta (\csc \theta - \sin \theta)$

4.  $\sec^2 x (1 - \sin^2 x)$

5.  $\frac{\csc x}{\cot x}$

6.  $\frac{\sec \theta}{\csc \theta}$

7.  $\sec a \cdot \frac{\sin a}{\tan a}$

8.  $\frac{\tan^2 \theta}{\sec^2 \theta}$

9.  $\sin\left(\frac{\pi}{2} - x\right) \csc x$

10.  $\cot\left(\frac{\pi}{2} - x\right) \cos x$

11.  $\frac{\cos^2 y}{1 - \sin y}$

12.  $\frac{1}{\cot^2 x + 1}$