

## MATH 112 Formula Sheet

Basic Trigonometry:

$\theta$	$\sin \theta$	$\cos \theta$	$\tan \theta$
0	0	1	0
$\pi/6$	1/2	$\sqrt{3}/2$	$\sqrt{3}/3$
$\pi/4$	$\sqrt{2}/2$	$\sqrt{2}/2$	1
$\pi/3$	$\sqrt{3}/2$	1/2	$\sqrt{3}$
$\pi/2$	1	0	undef.

$$\tan \theta = \frac{\sin \theta}{\cos \theta} \quad \sec \theta = \frac{1}{\cos \theta}$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta} \quad \csc \theta = \frac{1}{\sin \theta}$$

Pythagorean Identities:

1.  $\sin^2 x + \cos^2 x = 1$
2.  $\tan^2 x + 1 = \sec^2 x$
3.  $1 + \cot^2 x = \csc^2 x$

Half Angle Identities:

$$\sin^2 x = \frac{1}{2}(1 - \cos 2x) \quad \cos^2 x = \frac{1}{2}(1 + \cos 2x)$$

Other Identities:

1.  $\sin A \cos B = \frac{1}{2}[\sin(A - B) + \sin(A + B)]$
2.  $\sin A \sin B = \frac{1}{2}[\cos(A - B) - \cos(A + B)]$
3.  $\cos A \cos B = \frac{1}{2}[\cos(A - B) + \cos(A + B)]$

Inverse Trig Functions:

$f(x)$	Domain	Range	Derivative
$\sin^{-1} x$	$[-1, 1]$	$[-\pi/2, \pi/2]$	$f'(x) = \frac{1}{\sqrt{1-x^2}}$
$\cos^{-1} x$	$[-1, 1]$	$[0, \pi]$	$f'(x) = \frac{-1}{\sqrt{1-x^2}}$
$\tan^{-1} x$	$(-\infty, \infty)$	$(-\pi/2, \pi/2)$	$f'(x) = \frac{1}{1+x^2}$

Integration Formulas:

$$\int \tan x \, dx = \ln |\sec x| + C \quad \int \sec x \, dx = \ln |\sec x + \tan x| + C$$