

TRIGONOMETRY REVIEW WORKSHEET

Any calculus student must know basic facts from trigonometry and be able to use them without any error. This sheet contains basic trigonometry information. Use the back side for practice to refresh your knowledge of trigonometry.

You are expected to know the following special values of trig functions. Values of angles in other quadrants can be found using reference angles and the table at right.

x	$\cos x$	$\sin x$	$\tan x$	$\sin x$ positive	$\sin x$ positive
0	1	0	0	$\cos x$ negative	$\cos x$ positive
$\frac{\pi}{6}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{3}$	$\tan x$ negative	$\tan x$ positive
$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	$\sin x$ negative	$\sin x$ negative
$\frac{\pi}{3}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\sqrt{3}$	$\cos x$ negative	$\cos x$ positive
$\frac{\pi}{2}$	0	1	und	$\tan x$ positive	$\tan x$ negative

You are expected to know the graphs of $\sin x$, $\cos x$, and $\tan x$. Information on the other three trig functions is also included.

	asymptotes	range	period	even or odd?
$\sin x$	none	$[-1, 1]$	2π	odd
$\cos x$	none	$[-1, 1]$	2π	even
$\tan x$	$\frac{\pi}{2} + \pi k$	$(-\infty, \infty)$	π	odd
$\cot x$	πk	$(-\infty, \infty)$	π	odd
$\sec x$	$\frac{\pi}{2} + \pi k$	$(-\infty, -1] \cup [1, \infty)$	2π	even
$\csc x$	πk	$(-\infty, -1] \cup [1, \infty)$	2π	odd

The following is a list of basic trig identities. You are expected to memorize those above the line. Those below the line need not be memorized, but you should know they exist, as they are sometimes used in homework problems.

$\sin x = \frac{\text{opp}}{\text{hyp}}$ $\csc x = \frac{\text{hyp}}{\text{opp}}$ $\sin x = \frac{1}{\csc x}$ $\csc x = \frac{1}{\sin x}$ $\sin^2 x + \cos^2 x = 1$ $\cos^2 x = \frac{1 + \cos 2x}{2}$ $\sin 2x = 2 \sin x \cos x$	$\cos x = \frac{\text{adj}}{\text{hyp}}$ $\sec x = \frac{\text{hyp}}{\text{adj}}$ $\cos x = \frac{1}{\sec x}$ $\sec x = \frac{1}{\cos x}$ $\tan^2 x + 1 = \sec^2 x$ $\sin^2 x = \frac{1 - \cos 2x}{2}$	$\tan x = \frac{\text{opp}}{\text{adj}}$ $\cot x = \frac{\text{adj}}{\text{opp}}$ $\tan x = \frac{1}{\cot x} = \frac{\sin x}{\cos x}$ $\cot x = \frac{1}{\tan x} = \frac{\cos x}{\sin x}$ $1 + \csc^2 x = \cot^2 x$
$\sin(x \pm y) = \sin x \cos y \pm \cos x \sin y$ $\sin \frac{x}{2} = \pm \sqrt{\frac{1 - \cos x}{2}}$	$\cos 2x = \cos^2 x - \sin^2 x = 2 \cos^2 x - 1 = 1 - 2 \sin^2 x$ $\cos(x \pm y) = \cos x \cos y \mp \sin x \sin y$ $\cos \frac{x}{2} = \pm \sqrt{\frac{1 + \cos x}{2}}$	$\tan 2x = \frac{2 \tan x}{1 - \tan^2 x}$ $\tan(x + y) = \frac{\tan x + \tan y}{1 - \tan x \tan y}$ $\tan \frac{x}{2} = \frac{1 - \cos x}{\sin x} = \frac{\sin x}{1 + \cos x}$

Evaluate the following special values of trig functions without any assistance.

x	$\cos x$	$\sin x$	$\tan x$
0			
$\frac{\pi}{6}$			
$\frac{\pi}{4}$			
$\frac{\pi}{3}$			
$\frac{\pi}{2}$			

Fill in the table of information about the graphs of trig functions without any assistance.

	asymptotes	range	period	even or odd?
$\sin x$				
$\cos x$				
$\tan x$				

Complete the table with each definition without any assistance.

$$\sin x = \frac{\text{opposite}}{\text{hypotenuse}} \quad \cos x = \frac{\text{adjacent}}{\text{hypotenuse}} \quad \tan x = \frac{\text{opposite}}{\text{adjacent}}$$

$$\csc x = \frac{1}{\sin x} \quad \sec x = \frac{1}{\cos x} \quad \cot x = \frac{1}{\tan x}$$

Complete the table with each trig identity without any assistance.

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

$$\csc^2 x = 1 + \cot^2 x \quad \sec^2 x = 1 + \tan^2 x \quad \sin^2 x = \frac{1 - \cos 2x}{2}$$

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

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