



The Circular Functions

FUNCTION	GRAPH	DOMAIN	RANGE	PERIOD	FORMULAS
sine (odd fn)		all real numbers	$[-1, 1]$	2π	$\sin x = \sin(x + 2k\pi)$ $\sin(-x) = -\sin x$ $\sin(x \pm \pi) = \mp \sin x$ $\sin(\pi - x) = \sin x$ $\cos x = \cos(x + 2k\pi)$ $\cos(-x) = \cos x$ $\cos(x \pm \pi) = \mp \cos x$ $\cos(\pi - x) = -\cos x$
cosine (even fn)		all real numbers	$[-1, 1]$	2π	$\csc x = \frac{1}{\sin x}$ $\sec x = \frac{1}{\cos x}$ $\tan x = \frac{\sin x}{\cos x} = \frac{1}{\cot x}$ $\cot x = \frac{\cos x}{\sin x} = \frac{1}{\tan x}$
tangent (odd fn)		all real numbers except $\frac{\pi}{2} + k\pi$	all real numbers	π	PYTHAGOREAS $\sin^2 x + \cos^2 x = 1$ $1 + \cot^2 x = \csc^2 x$ $1 + \tan^2 x = \sec^2 x$ COFACTOR IDENTITIES $\sin(x \pm \frac{\pi}{2}) = \pm \cos x$ $\cos(x \pm \frac{\pi}{2}) = \mp \sin x$
cosecant (odd fn)		all real numbers except $k\pi$	$(-\infty, -1] \cup [1, \infty)$	2π	 Signs of Trig Functions even: $f(x) = f(-x)$ odd: $f(-x) = -f(x)$
secant (even fn)		all real numbers except $\frac{\pi}{2} + k\pi$	$(-\infty, -1] \cup [1, \infty)$	2π	 SPECIAL TRIANGLES Quadrant 2: \sin, \csc are + Quadrant 3: \tan, \cot are + Quadrant 4: \cos, \sec are + Quadrant 1: all are + In Δ : $\sin \theta = \frac{y}{r}$, $\cos \theta = \frac{x}{r}$, $\tan \theta = \frac{y}{x}$ $\csc \theta = \frac{r}{y}$, $\sec \theta = \frac{r}{x}$, $\cot \theta = \frac{x}{y}$
cotangent (odd fn)		all real numbers except $k\pi$	all real numbers	π	

	QUADRANT I				QUADRANT II				QUADRANT III				QUADRANT IV				
degrees θ	0°	30°	45°	60°	90°	120°	135°	150°	180°	210°	225°	240°	270°	300°	315°	330°	360°
radians θ	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π	$\frac{7\pi}{6}$	$\frac{5\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{7\pi}{4}$	$\frac{11\pi}{6}$	2π
$\sin \theta$																	
$\cos \theta$																	
$\tan \theta$																	
$\csc \theta$																	
$\sec \theta$																	
$\cot \theta$																	

*** On this page, k represents any integer.