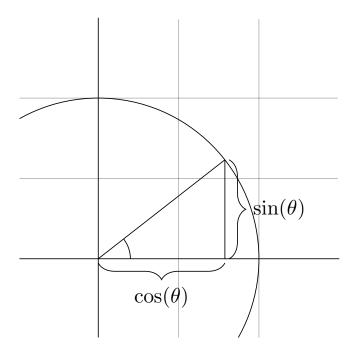
Trigonometry

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Basics

Definitions



$$\tan \theta \equiv \frac{\sin \theta}{\cos \theta}$$

$$\sec\theta \equiv \frac{1}{\cos\theta}$$

$$\csc\theta \equiv \frac{1}{\sin\theta}$$

$$\cot \theta \equiv \frac{1}{\tan \theta} \equiv \frac{\cos \theta}{\sin \theta}$$

<u>Identities</u>

$$\sin^2\theta + \cos^2\theta \equiv 1$$

$$1 + \tan^2 \theta \equiv \sec^2 \theta$$

$$1 + \cot^2 \theta \equiv \csc^2 \theta$$

$$\sin(\alpha \pm \beta) \equiv \sin\alpha \cos\beta \pm \cos\alpha \sin\beta$$

$$\cos(\alpha \pm \beta) \equiv \cos \alpha \cos \beta \mp \sin \alpha \sin \beta$$

$$\tan(\alpha \pm \beta) \equiv \frac{\tan \alpha \pm \tan \beta}{1 \mp \tan \alpha \tan \beta}$$

$$\sin 2\theta \equiv 2\sin\theta\cos\theta$$

$$\tan 2\theta \equiv \frac{2\tan \theta}{1 - \tan^2 \theta}$$

$$\cos 2\theta \equiv \cos^2 \theta - \sin^2 \theta$$
$$\equiv 2\cos^2 \theta - 1$$
$$\equiv 1 - 2\sin^2 \theta$$

Calculus

$$\frac{\mathrm{d}}{\mathrm{d}x}\sin x = \cos x$$

$$\frac{\mathrm{d}}{\mathrm{d}x}\cos x = -\sin x$$

$$\frac{\mathrm{d}}{\mathrm{d}x}\tan x = \sec^2 x$$

$$\frac{\mathrm{d}}{\mathrm{d}x}\sec x = \sec x \tan x$$

$$\frac{\mathrm{d}}{\mathrm{d}x}\csc x = -\csc x \cot x$$

$$\frac{\mathrm{d}}{\mathrm{d}x}\cot x = -\csc^2 x$$

$$\frac{\mathrm{d}}{\mathrm{d}x}\arcsin x = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{\mathrm{d}}{\mathrm{d}x}\arccos x = -\frac{1}{\sqrt{1-x^2}}$$

$$\frac{\mathrm{d}}{\mathrm{d}x}\arctan x = \frac{1}{x^2 + 1}$$

$$\int \sin x \, \mathrm{d}x = -\cos x + C$$

$$\int \cos x \, \mathrm{d}x = \sin x + C$$

$$\int \tan x \, \mathrm{d}x = \ln|\sec x| + C$$

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

$$\int \csc x \, dx = -\ln|\cot x + \csc x| + C$$

$$\int \cot x \, \mathrm{d}x = \ln|\sin x| + C$$

$$\int \arcsin x \, dx = x \arcsin x + \sqrt{1 - x^2} + C$$

$$\int \arccos x \, dx = x \arccos x - \sqrt{1 - x^2} + C$$

$$\int \arctan x \, dx = x \arctan x - \frac{\ln(x^2 + 1)}{2} + C$$

Graphs

