

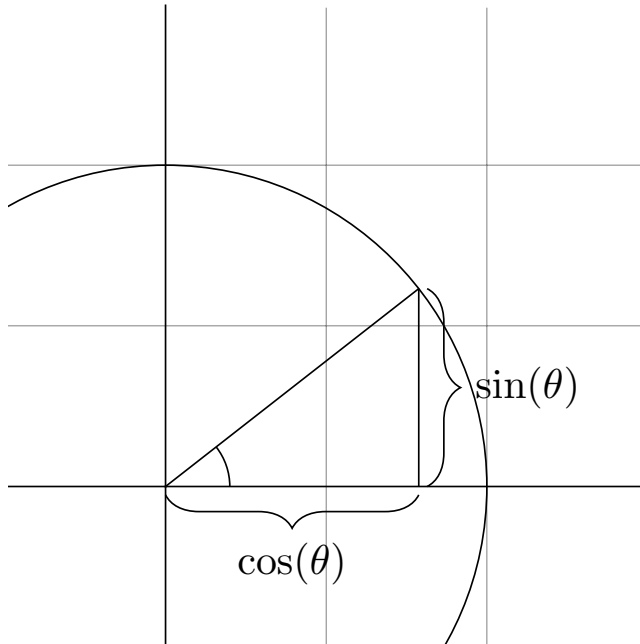
Trigonometry

Contents

Basics	2
Definitions	2
Identities	2
Calculus	3
Graphs	4

Basics

Definitions



Remember

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

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

$$\operatorname{cosec} \theta \equiv \frac{1}{\sin \theta}$$

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

Identities

Remember

$$\sin^2 \theta + \cos^2 \theta \equiv 1 \quad 1 + \tan^2 \theta \equiv \sec^2 \theta \quad 1 + \cot^2 \theta \equiv \operatorname{cosec}^2 \theta$$

Formula Book

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

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

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

Remember

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

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

$$\begin{aligned} \cos 2\theta &\equiv \cos^2 \theta - \sin^2 \theta \\ &\equiv 2 \cos^2 \theta - 1 \\ &\equiv 1 - 2 \sin^2 \theta \end{aligned}$$

Calculus

Remember

$$\begin{aligned} \frac{d}{dx} \sin x &= \cos x & \int \sin x \, dx &= -\cos x + C \\ \frac{d}{dx} \cos x &= -\sin x & \int \cos x \, dx &= \sin x + C \end{aligned}$$

$$\begin{aligned} \int \arcsin x \, dx &= x \arcsin x + \sqrt{1-x^2} + C \\ \int \arccos x \, dx &= x \arccos x - \sqrt{1-x^2} + C \\ \int \arctan x \, dx &= x \arctan x - \frac{\ln(x^2+1)}{2} + C \end{aligned}$$

Formula Book

$$\begin{aligned} \frac{d}{dx} \tan x &= \sec^2 x & \int \tan x \, dx &= \ln |\sec x| + C & \frac{d}{dx} \arcsin x &= \frac{1}{\sqrt{1-x^2}} \\ \frac{d}{dx} \sec x &= \sec x \tan x & \int \sec x \, dx &= \ln |\tan x + \sec x| + C & \frac{d}{dx} \arccos x &= -\frac{1}{\sqrt{1-x^2}} \\ \frac{d}{dx} \operatorname{cosec} x &= -\operatorname{cosec} x \cot x & \int \operatorname{cosec} x \, dx &= -\ln |\cot x + \operatorname{cosec} x| + C & \frac{d}{dx} \arctan x &= \frac{1}{x^2+1} \\ \frac{d}{dx} \cot x &= -\operatorname{cosec}^2 x & \int \cot x \, dx &= \ln |\sin x| + C \end{aligned}$$

Graphs

