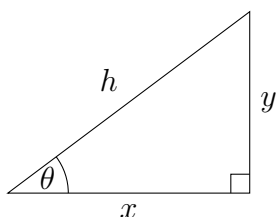




U of I Polya Handouts: Trigonometry Review

Trigonometric Functions



$$\begin{aligned} \sin \theta &= \frac{y}{h} & \csc \theta &= \frac{1}{\sin \theta} = \frac{h}{y} \\ \cos \theta &= \frac{x}{h} & \sec \theta &= \frac{1}{\cos \theta} = \frac{h}{x} \\ \tan \theta &= \frac{y}{x} & \cot \theta &= \frac{1}{\tan \theta} = \frac{x}{y} \end{aligned}$$

Even-odd Properties

$$\begin{aligned} \sin(-x) &= -\sin x \\ \cos(-x) &= \cos x \\ \tan(-x) &= -\tan x \end{aligned}$$

Pythagorean Identities

$$\begin{aligned} \sin^2 \theta + \cos^2 \theta &= 1 \\ 1 + \tan^2 \theta &= \sec^2 \theta \\ 1 + \cot^2 \theta &= \csc^2 \theta \end{aligned}$$

Addition and Subtraction Formulas

“Sine crosses and keeps the sign, cosine does not cross and keeps no sign.”

$$\begin{aligned} \sin(x + y) &= \sin x \cos y + \cos x \sin y \\ \sin(x - y) &= \sin x \cos y - \cos x \sin y \\ \cos(x + y) &= \cos x \cos y - \sin x \sin y \\ \cos(x - y) &= \cos x \cos y + \sin x \sin y \end{aligned}$$

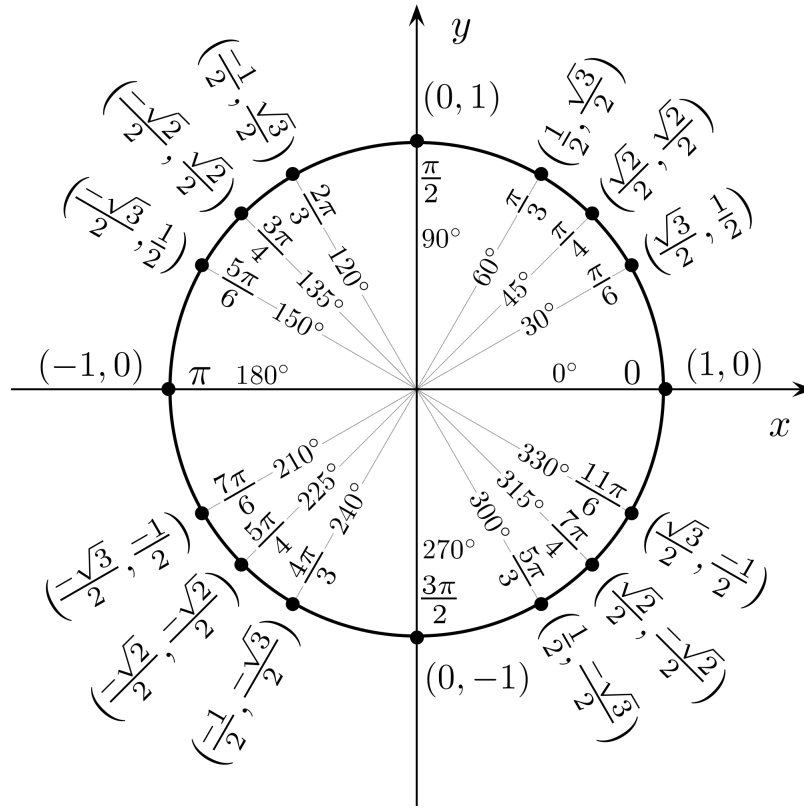
Double-Angle Formulas

$$\begin{aligned} \sin(2x) &= 2 \sin x \cos x \\ \cos(2x) &= \cos^2 x - \sin^2 x \\ &= 2 \cos^2 x - 1 = 1 - 2 \sin^2 x \\ \tan(2x) &= \frac{2 \tan x}{1 - \tan^2 x} \end{aligned}$$

Half-Angle Formulas

$$\begin{aligned} \sin^2 x &= \frac{1 - \cos(2x)}{2} \\ \cos^2 x &= \frac{1 + \cos(2x)}{2} \end{aligned}$$

The Unit Circle



Graphs

