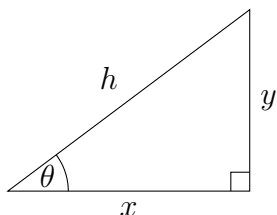U of I Polya Handouts:
Trigonometry Review

Trigonometric Functions

$$\sin\theta = \frac{y}{h} \qquad \csc\theta = \frac{1}{\sin\theta} = \frac{h}{y}$$

$$\cos\theta = \frac{x}{h} \qquad \sec\theta = \frac{1}{\cos\theta} = \frac{h}{x}$$

$$\tan\theta = \frac{y}{x} \qquad \cot\theta = \frac{1}{\tan\theta} = \frac{x}{y}$$

Even-odd Properties

$$\sin(-x) = -\sin x$$
$$\cos(-x) = \cos x$$
$$\tan(-x) = -\tan x$$

Pythagorean Identities

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

Addition and Subtraction Formulas

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

$$\sin(x+y) = \sin x \cos y + \cos x \sin y$$
$$\sin(x-y) = \sin x \cos y - \cos x \sin y$$
$$\cos(x+y) = \cos x \cos y - \sin x \sin y$$
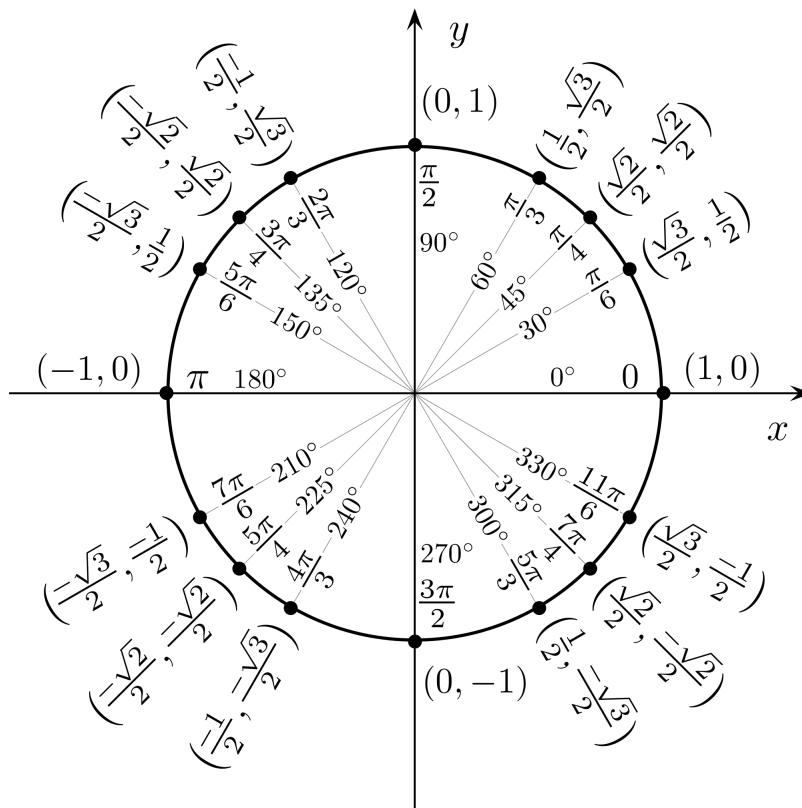$$\cos(x-y) = \cos x \cos y + \sin x \sin y$$

Double-Angle Formulas

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

Half-Angle Formulas
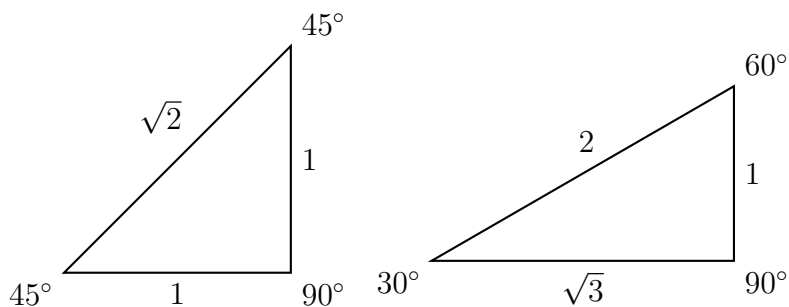
$$\sin^2 x = \frac{1 - \cos(2x)}{2}$$
$$\cos^2 x = \frac{1 + \cos(2x)}{2}$$

The Unit Circle

Special Triangles

Inverse Trig Function Domain and Range Restrictions

Inverse trig Function	Domain	Range
$\sin x$	$[-1, 1]$	$\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$
$\cos x$	$[-1,1]$	$[0, \pi]$
$\tan x$	$(-\infty, \infty)$	$(-\pi/2, \pi/2)$