Trigonometric identities

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Tan(x)

$$tan(x) = \frac{sin(x)}{cos(x)}$$

Reciprocals

$$\frac{1}{sin(x)} = csc(x)$$

$$\frac{1}{cos(x)} = sec(x)$$

$$\frac{1}{tan(x)} = cot(x)$$

Squared notation

$$(sin(x))^2 = sin^2(x)$$

$$(cos(x))^2 = cos^2(x)$$

$$(tan(x))^2 = tan^2(x)$$

$$(csc(x))^2 = csc^2(x)$$

$$(sec(x))^2 = sec^2(x)$$

$$(cot(x))^2 = cot^2(x)$$

Pythagorean identities

$$sin^2(x) + cos^2(x) = 1$$

$$1 + tan^2(x) = sec^2(x)$$

$$1 + cot^2(x) = csc^2(x)$$

Negative inputs

$$sin(-x) = -sin(x)$$

$$cos(-x) = cos(x)$$

$$tan(-x) = -tan(x)$$

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Translations

$$sin(x) = cos\left(\frac{\pi}{2} - x\right)$$

$$cos(x) = sin\left(\frac{\pi}{2} - x\right)$$

$$tan(x) = cot\left(\frac{\pi}{2} - x\right)$$

Multiple angle inputs

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

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

Removing the square

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

$$cos^2(x) = \frac{1 + cos(2x)}{2}$$

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How to read aloud

Notation	Pronunciation
$sin(x)$	'Sin x' or 'sine x'
$cos(x)$	'cos x' or 'cosine x'
$tan(x)$	'tan x' or 'tangent x'
$csc(x)$	'cosec x' or 'cosecant x'
$sec(x)$	'sec x' or 'secant x'
$cot(x)$	'cot x' or 'cotangent x'

Differentiation

$$\frac{d(sin(bx))}{dx} = b\,cos(bx)$$

$$\frac{d(cos(bx))}{dx} = -b\,sin(bx)$$

Integration

$$\int sin(bx)\,dx = \frac{-cos(bx)}{b}$$

$$\int cos(bx)\,dx = \frac{sin(bx)}{b}$$

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