Trigonometry Cheat Sheet

A comprehensive cheat sheet covering essential trigonometry concepts, identities, functions, and formulas. Useful for quick reference and exam preparation.

Basic Trigonometric Functions

Right Triangle Definitions

Sine (sin θ)	opposite / hypotenuse
Cosine (cos θ)	adjacent / hypotenuse
Tangent (tan θ)	opposite / adjacent
Cosecant (csc θ)	hypotenuse / opposite (1 / sin θ)
Secant (sec θ)	hypotenuse / adjacent (1 / cos θ)
Cotangent (cot θ)	adjacent / opposite (1 / tan θ)

Reciprocal Identities

sin θ	1 / csc θ
cos θ	1 / sec θ
tan θ	1 / cot θ
csc θ	1 / sin θ
sec θ	1 / cos θ
cot θ	1 / tan θ

Quotient Identities

tan θ	sin θ / cos θ
cot θ	cos θ / sin θ

Trigonometric Identities

Pythagorean Identities

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

Angle Sum and Difference Identities

sin(A + B)	sin A cos B + cos A sin B
sin(A - B)	sin A cos B - cos A sin B
cos(A + B)	cos A cos B - sin A sin B
cos(A - B)	cos A cos B + sin A sin B
tan(A + B)	(tan A + tan B) / (1 - tan A tan B)
tan(A - B)	(tan A - tan B) / (1 + tan A tan B)

Double Angle Identities

sin(2θ)	2 sin θ cos θ
cos(2θ)	$\cos^2 \theta - \sin^2 \theta = 2\cos^2 \theta - 1 = 1 - 2\sin^2 \theta$
tan(2θ)	$2 \tan \theta / (1 - \tan^2 \theta)$

Half Angle Identities

sin(θ/2)	±√((1 - cos θ) / 2)
cos(θ/2)	±√((1 + cos θ) / 2)
tan(θ/2)	sin θ / (1 + cos θ) = (1 - cos θ) / sin θ

Unit Circle

Common Angles

0° (0 radians)	(1, 0)
30° (π/6 radians)	(√3/2, 1/2)
45° (π/4 radians)	(√2/2, √2/2)
60° (π/3 radians)	(1/2, √3/2)
90° (π/2 radians)	(0, 1)
180° (π radians)	(-1, 0)
270° (3π/2 radians)	(0, -1)

Sine and Cosine Values

sin θ	y-coordinate
cos θ	x-coordinate

Tangent Values

tan θ = sin θ / cos θ = y / x	

Laws and Formulas

Law of Sines

a / sin A = b / sin B = c / sin C

Law of Cosines

$a^2 = b^2 + c^2 - 2bc \cos A$
$b^2 = a^2 + c^2 - 2ac \cos B$
$c^2 = a^2 + b^2 - 2ab \cos C$

Area of a Triangle

Area (using sides and angle)	1/2 * ab * sin C = 1/2 * bc * sin A = 1/2 * ac * sin B
Heron's Formula (using sides)	Area = √(s(s - a)(s - b)(s - c)), where s = (a + b + c) / 2