Formulas from Geometry

Area Formulas

Square

$A = s^2$ where s is the side length

$A = \frac{1}{2}d^2$ where d is the length of the diagonal

Triangle

$A = \frac{1}{2}bh$ where b is the base and h is the altitude

$A = \sqrt{s(s-a)(s-b)(s-c)}$ where s is the semiperimeter and a, b, and c are the sides

$A = sr$ where s is the semiperimeter and r is the radius of the inscribed circle

$A = \frac{1}{2}ab\sin\theta$ where a and b are two sides and θ is the measure of the angle between a and b

Equilateral Triangle

$A = \frac{1}{4}s^2\sqrt{3}$ where s is the side length

$A = \frac{1}{3}h^2\sqrt{3}$ where h is the altitude

Parallelogram

$A = bh$ where b is the base and h is the altitude

Rhombus

$A = bh$ where b is the base and h is the altitude

$A = \frac{1}{2}d_1d_2$ where d_1 and d_2 are the two diagonals

Kite

$A = \frac{1}{2}d_1d_2$ where d_1 and d_2 are the two diagonals

Trapezoid

$A = \frac{1}{2}(b_1 + b_2)h$ where b_1 and b_2 are the parallel bases and h is the distance between them

Cyclic Quadrilateral

$A = \sqrt{(s-a)(s-b)(s-c)(s-d)}$ where s is the semiperimeter and a, b, c, d are the sides

Regular Polygon

$A = \frac{1}{2}ans$ where a is the apothem, n is the number of sides, and s is the side length

$A = \frac{1}{2}ap$ where a is the apothem and p is the perimeter

Ellipse

$A = ab\pi$ where a is half the major axis and b is half the minor axis

Circle

$A = \pi r^2$ where r is the radius

$A = \frac{1}{2}Cr$ where C is the circumference and r is the radius

$A = \frac{1}{4}\pi d^2$ where d is the diameter

Sector of a Circle

$A = \frac{1}{360^\circ}\pi ar^2$ where a is the angle (in degrees) that intercepts the arc and r is the radius

$A = \frac{1}{2}ar^2$ where a is the angle (in radians) that intercepts the arc and r is the radius

Surface Area Formulas

Prism and Cylinder

$S = 2B + ph$ where B is the area of the base, p is the perimeter of the base, and h is the height

Pyramid and Cone

$S = B + \frac{1}{2}ps$ where B is the area of the base, p is the perimeter of the base, and s is the slant height of a lateral face

Sphere

$S = 4\pi r^2$ where r is the radius

Volume Formulas

Prism and Cylinder

$V = Bh$ where B is the area of the base and h is the height

Pyramid and Cone

$V = \frac{1}{3}Bh$ where B is the area of the base and h is the height

Sphere

$V = \frac{4}{3}\pi r^3$ where r is the radius

Greek Alphabet

Upper case	Lower case		Upper case	Lower case	
A	α	alpha	N	ν	nu
B	β	beta	Ξ	ξ	xi
Γ	γ	gamma	O	o	omicron
Δ	δ	delta	Π	π	pi
E	ϵ	epsilon	R	ρ	rho
Z	ζ	zeta	Σ	σ	sigma
H	η	eta	T	τ	tau
Θ	θ	theta	Υ	υ	upsilon
I	ι	iota	Φ	ϕ	phi
K	κ	kappa	X	χ	chi
Λ	λ	lambda	Ψ	ψ	psi
M	μ	mu	Ω	ω	omega

Trigonometric Values

$\sin 0 = 0$

$\cos 0 = 1$

$\tan 0 = 0$

$\sin \frac{\pi}{6} = \frac{1}{2}$

$\cos \frac{\pi}{6} = \frac{\sqrt{3}}{2}$

$\tan \frac{\pi}{6} = \frac{\sqrt{3}}{3}$

$\sin \frac{\pi}{4} = \frac{\sqrt{2}}{2}$

$\cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}$

$\tan \frac{\pi}{4} = 1$

$\sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}$

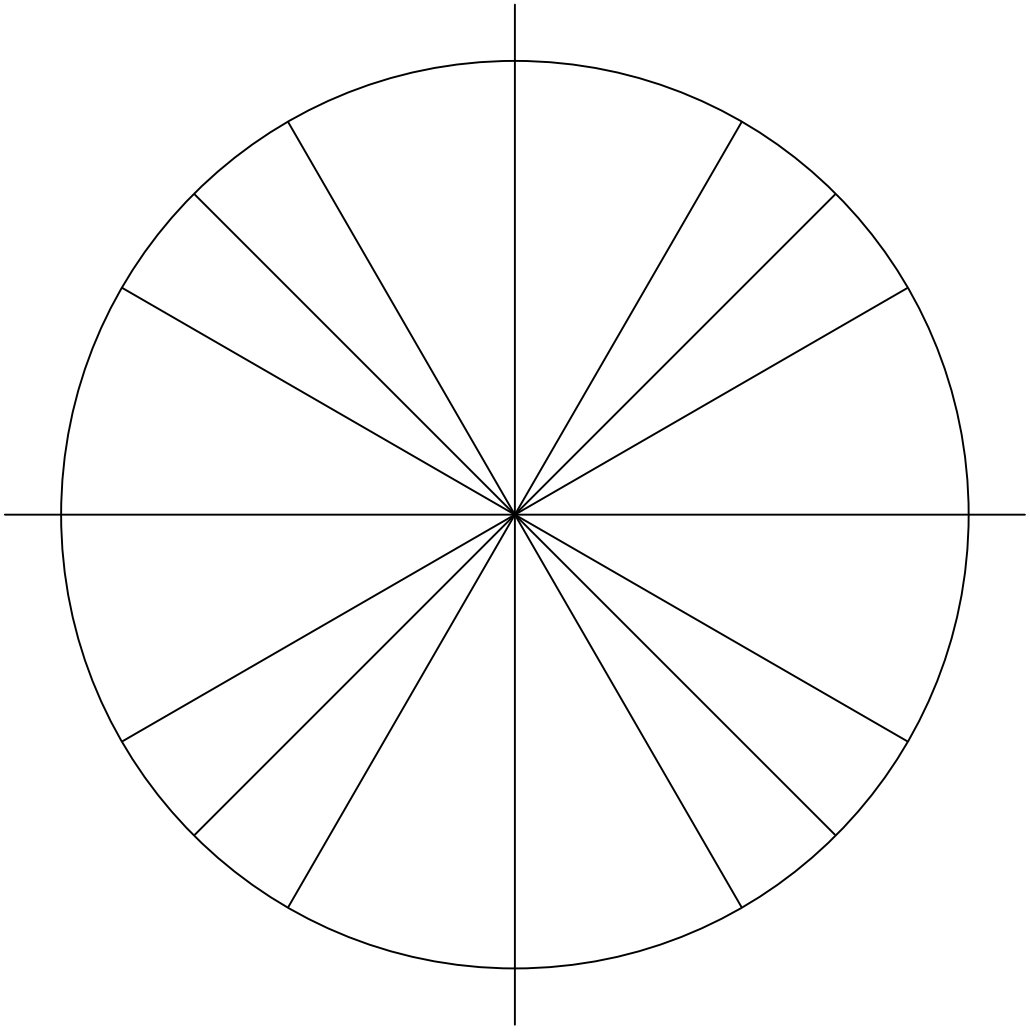
$\cos \frac{\pi}{3} = \frac{1}{2}$

$\tan \frac{\pi}{3} = \sqrt{3}$

$\sin \frac{\pi}{2} = 1$

$\cos \frac{\pi}{2} = 0$

$\tan \frac{\pi}{2}$ is undefined



Useful Trigonometric Identities

Triangle Ratios

$$\sin x = \frac{\text{opposite}}{\text{hypotenuse}} \qquad \cos x = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\csc x = \frac{1}{\sin x} = \frac{\text{hypotenuse}}{\text{opposite}} \qquad \sec x = \frac{1}{\cos x} = \frac{\text{hypotenuse}}{\text{adjacent}}$$

$$\cot x = \frac{\cos x}{\sin x} = \frac{\text{adjacent}}{\text{opposite}} \qquad \tan x = \frac{\sin x}{\cos x} = \frac{\text{opposite}}{\text{adjacent}}$$

Pythagorean Identities

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

Double Angle Identities

$$\sin 2x = 2 \sin x \cos x \qquad \cos 2x = \cos^2 x - \sin^2 x = 1 - 2\sin^2 x = 2\cos^2 x - 1$$

Power Identities

$$\sin^2 x = \frac{1 - \cos 2x}{2} \qquad \cos^2 x = \frac{1 + \cos 2x}{2}$$

Sum and Difference Identities

$$\sin(x \pm y) = \sin x \cos y \pm \cos x \sin y \qquad \cos(x \pm y) = \cos x \cos y \mp \sin x \sin y$$

Law of Cosines

$$c^2 = a^2 + b^2 - 2ab \cos \gamma$$

Law of Sines

$$\frac{\sin \alpha}{a} = \frac{\sin \beta}{b} = \frac{\sin \gamma}{c}$$