Log/Trigonometry Reference Sheet

Angle Measurement:

	0	30	45	60	90	180	270
$\sin x$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	0	–1
$\cos x$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	–1	0
$\tan x$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	∞	0	∞

Degrees to Radians: $\times \frac{\pi}{180}$

Radians to Degrees: $\times \frac{180}{\pi}$

Quotient Formula:

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

$$\cot x = \frac{\cos x}{\sin x}$$

Reciprocal Formulas:

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

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

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

Length/Area Formulas:

Arc Length: $S = r\,\Theta$

Area of a Triangle: $A = \frac{1}{2}ab\sin C$

Pythagorean Identities:

$$\sin^2 x + \cos^2 x = 1$$

$$1 + \tan^2 x = \sec^2 x$$

$$\cot^2 x + 1 = \csc^2 x$$

Sum/Difference Formulas:

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

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

$$\tan(x+y) = \frac{\tan x + \tan y}{1 - \tan x\tan y} \qquad \tan(x-y) = \frac{\tan x - \tan y}{1 + \tan x\tan y}$$

Logarithm Rules:

$$\log(AB) = \log A + \log B$$

$$\log\left(\frac{A}{B}\right) = \log A - \log B$$

$$\log A^n = n \bullet \log A$$

Double Angle Formulas:

$$\sin 2x = 2\sin x\cos x$$

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

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

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

$$\tan 2x = \frac{2\tan x}{1 - \tan^2 x}$$

Half Angle Formulas:

$$\sin\tfrac{1}{2}x = \pm\sqrt{\tfrac{1-\cos x}{2}}$$

$$\cos\tfrac{1}{2}x = \pm\sqrt{\tfrac{1+\cos x}{2}}$$

$$\tan\tfrac{1}{2}x = \pm\sqrt{\tfrac{1-\cos x}{1+\cos x}}$$

Rules of Exponents:

$$a^x \times a^y = a^{x+y}$$

$$\frac{a^x}{a^y} = a^{x-y}$$

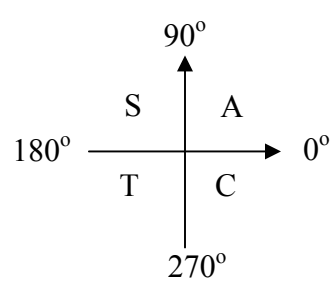
$$(a^x)^y = a^{xy}$$

$$a^{-n} = \frac{1}{a^n}$$

$$\sqrt[y]{a^x} = a^{x/y}$$

Law of Sines: $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$ **(use with S–S–A–A)**

Law of Cosines: $c^2 = a^2 + b^2 - 2ab\cos C$ **(use with S–S–S–A)**

or

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$