TRIGONOMETRY FORMULAS

SINE RATIO

Sine Ratio: $\sin\theta = \frac{\text{Opp}}{\text{Hyp}}$

Cosine Ratio: $\cos\theta = \frac{\text{Adj}}{\text{Hyp}}$

Tangent Ratio: $\tan\theta = \frac{\text{Opp}}{\text{Adj}}$

Cotangent: $\cot\theta = \frac{\text{Adj}}{\text{Opp}}$

Secant: $\sec\theta = \frac{1}{\cos\theta}$

Cosecant: $\csc\theta = \frac{1}{\sin\theta}$

COMPLEMENTARY

$$\cos(90°-\theta) = \sin\theta$$

$$\tan(90°-\theta) = \cot\theta$$

$$\sin(A+B) = \sin A\cos B + \cos A\sin B$$

$$\sin(A-B) = \sin A\cos B - \cos A\sin B$$

$$\cos(A+B) = \cos A\cos B - \sin A\sin B$$

$$\cos(A-B) = \cos A\cos B + \sin A\sin B$$

HALF ANGLE

$$\cos^2\left(\frac{\theta}{2}\right) = \frac{1+\cos\theta}{2}$$

Degree to Radian: $\theta \times \left(\frac{\pi}{180}\right)$

Radian to Degree: $\theta \times \left(\frac{180}{\pi}\right)$

Law of Sines: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Law of Cosines

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

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

PYTHAGOREAN IDENTITY

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

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

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

$\tan\theta$: $\frac{\sin\theta}{\cos\theta}$

$\cot\theta$: $\frac{\cos\theta}{\sin\theta}$

$$\sin(90°-\theta) = \cos\theta$$

TANGENT FORMULA

$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A\tan B}$$

$$\tan(A-B) = \frac{\tan A - \tan B}{1 + \tan A\tan B}$$

$$\sin 2\theta = 2\sin\theta\cos\theta$$

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

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

$$\sin^2\left(\frac{\theta}{2}\right) = \frac{1-\cos\theta}{2}$$

SPECIAL VALUES

$\sin 0° = 0$, $\sin 30° = \frac{1}{2}$, $\sin 30° = \frac{1}{2}$,
$\sin 45° = \frac{1}{\sqrt{2}}$, $\sin 60° = \frac{\sqrt{3}}{2}$, $\sin 90° = 1$

$\cos 0° = 1$, $\cos 30° = \frac{\sqrt{3}}{2}$,
$\cos 45° = \frac{1}{\sqrt{2}}$, $\cos 60° = \frac{1}{2}$, $\cos 90° = 0$

$\tan 0° = 0$, $\tan 30° = \frac{1}{\sqrt{3}}$,
$\tan 45° = 1$, $\tan 60° = \sqrt{3}$, $\tan 90° = \infty$