

## Useful Tools & Formulas

### Quadratic Equations

Factored Form:

$$y = a(x-s)(x-t)$$

Vertex Form:

$$y = a(x-h)^2 + k$$

Standard Form:

$$y = ax^2 + bx + c$$

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

### Trigonometry

$$\sin \theta = \frac{\text{opp}}{\text{hyp}} \quad \cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \tan \theta = \frac{\text{opp}}{\text{adj}}$$

Sine Law

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

Cosine Law

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

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

Reciprocal Identities

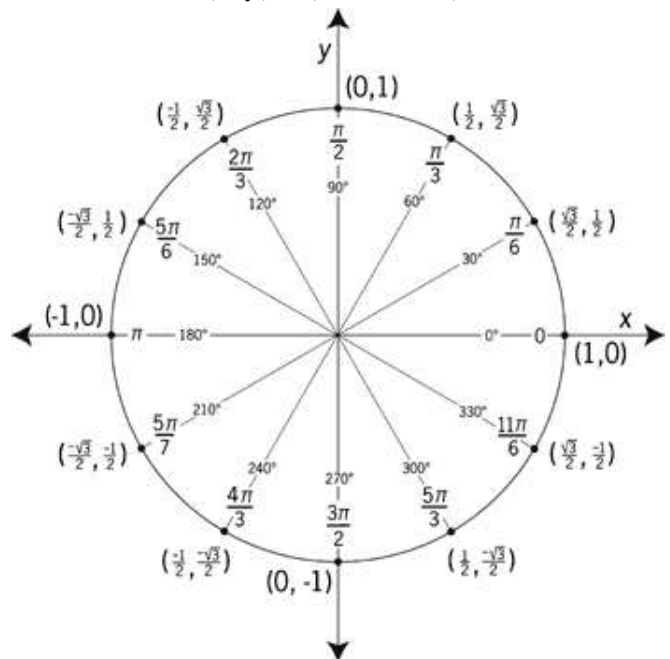
$$\csc \theta = \frac{1}{\sin \theta} \quad \sec \theta = \frac{1}{\cos \theta} \quad \cot \theta = \frac{1}{\tan \theta}$$

Fundamental Trigonometric Identities

$$\sin^2 \theta + \cos^2 \theta = 1 \quad \tan \theta = \frac{\sin \theta}{\cos \theta}$$

Unit Circle

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



### Sequence & Series

Arithmetic

$$t_n = a + (n-1)d$$

$$S_n = \frac{n}{2}(a + t_n)$$

$$S_n = \frac{n}{2}(2a + (n-1)d)$$

Geometric

$$t_n = a(r)^{n-1}$$

$$S_n = \frac{a(r^n - 1)}{r - 1}$$