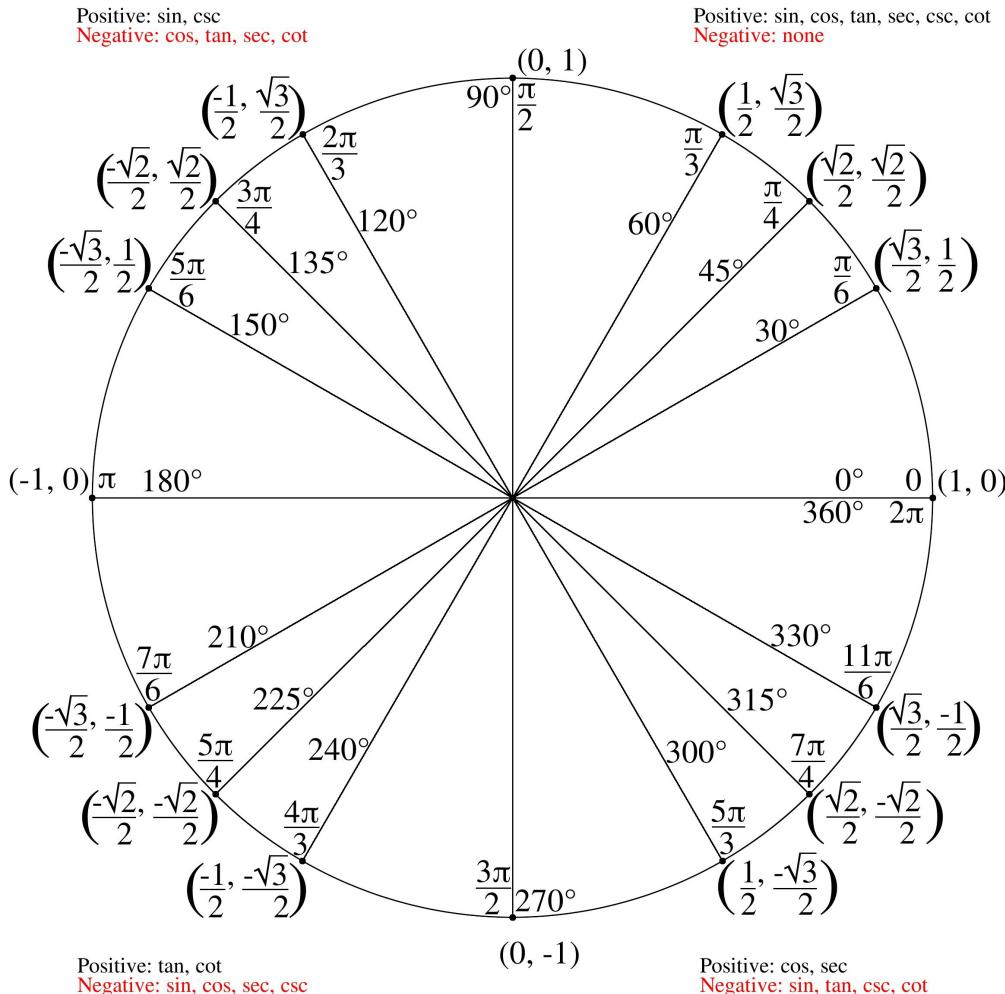


# The Unit Circle



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

$$\cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cos \beta + \sin \alpha \sin \beta$$

$$\sin(\alpha + \beta) = \sin \alpha \cos \beta + \cos \alpha \sin \beta$$

$$\sin(\alpha - \beta) = \sin \alpha \cos \beta - \cos \alpha \sin \beta$$

$$\tan(\alpha + \beta) = \frac{\tan \alpha + \tan \beta}{1 - \tan \alpha \tan \beta}$$

$$\tan(\alpha - \beta) = \frac{\tan \alpha - \tan \beta}{1 + \tan \alpha \tan \beta}$$

$$\sin(2\theta) = 2 \sin \theta \cos \theta$$

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

$$\cos(2\theta) = 2 \cos^2 \theta - 1$$

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

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

$$\sin(\theta / 2) = \pm \sqrt{\frac{1}{2}(1 - \cos \theta)}$$

$$\cos(\theta / 2) = \pm \sqrt{\frac{1}{2}(1 + \cos \theta)}$$

$$\tan(\theta / 2) = \pm \sqrt{\frac{1 - \cos \theta}{1 + \cos \theta}}$$

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

$$\csc \theta = \frac{hyp}{opp} \quad \sec \theta = \frac{hyp}{adj} \quad \cot \theta = \frac{adj}{opp}$$

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

$$K = \frac{1}{2} ab \sin C = \sqrt{s(s-a)(s-b)(s-c)}$$

$$z_1 z_2 = r_1 r_2 (\cos(\theta_1 + \theta_2) + i \sin(\theta_1 + \theta_2))$$

$$\frac{z_1}{z_2} = \frac{r_1}{r_2} (\cos(\theta_1 - \theta_2) + i \sin(\theta_1 - \theta_2))$$

$$z^n = r^n ((\cos(n\theta) + i \sin(n\theta)))$$

$$\mathbf{u}_1 \cdot \mathbf{u}_2 = x_1 x_2 + y_1 y_2 + z_1 z_2$$

$$\mathbf{u}_1 \times \mathbf{u}_2 = \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ x_1 & y_1 & z_1 \\ x_2 & y_2 & z_2 \end{vmatrix}$$

$$\cos \theta = \frac{\mathbf{u}_1 \cdot \mathbf{u}_2}{\| \mathbf{u}_1 \| \| \mathbf{u}_2 \|}$$

$$\mathbf{u} = \frac{\mathbf{v}}{\|\mathbf{v}\|}$$

$$\mathbf{v} = \|\mathbf{v}\|(\cos \theta \mathbf{i} + \sin \theta \mathbf{j})$$