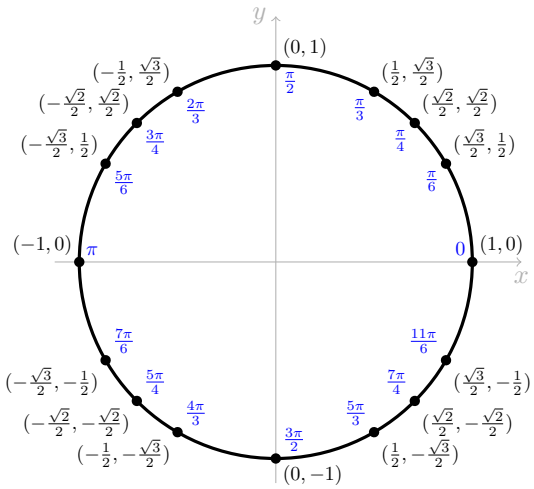
Formulas

Common Angles



Arc Length for Parametric Curves

$$L = \int_a^b \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2}\, dt$$

Areas in Polar Coordinates

$$A = \int_a^b \tfrac{1}{2} r^2 d\theta$$

Slopes of Polar Curves

$$\frac{dy}{dx} = \frac{dy/d\theta}{dx/d\theta} = \frac{(dr/d\theta)\sin(\theta) + r\cos\theta}{(dr/d\theta)\cos(\theta) - r\sin\theta}$$

Cross Product

$$\mathbf{a} \times \mathbf{b} = \begin{vmatrix} a_2 & a_3 \\ b_2 & b_3 \end{vmatrix} \mathbf{i} - \begin{vmatrix} a_1 & a_3 \\ b_1 & b_3 \end{vmatrix} \mathbf{j} + \begin{vmatrix} a_1 & a_2 \\ b_1 & b_2 \end{vmatrix} \mathbf{k}$$

Cross Product Length

$$||\mathbf{a} \times \mathbf{b}|| = ||\mathbf{a}||\,||\mathbf{b}||\sin\theta$$

Vector Equation for a Line

$$\mathbf{r_0} + \mathbf{v}t$$

Vector Equation for a Plane

$$\mathbf{n} \cdot (\mathbf{r} - \mathbf{r_0}) = 0$$