

## Formula Sheet

Parametric Equations:

$$x = f(t), \quad y = g(t), \quad \alpha \leq t \leq \beta$$

Slope of a tangent line:

$$\frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}} = \frac{g'(t)}{f'(t)}$$

Area:

$$\int_{\alpha}^{\beta} g(t) f'(t) dt$$

Arclength:

$$\int_{\alpha}^{\beta} \sqrt{(f'(t))^2 + (g'(t))^2} dt$$

Surface area:

$$\int_{\alpha}^{\beta} 2\pi g(t) \sqrt{(f'(t))^2 + (g'(t))^2} dt$$