

$$s = \begin{cases} \int_a^b \sqrt{1 + y'^2} \, dx & y = f(x) \\ \int_{t_1}^{t_2} \sqrt{\dot{x}^2 + \dot{y}^2} \, dt & x = f(t); y = f(t) \\ \int_{\varphi_1}^{\varphi_2} \sqrt{\left(\frac{dr}{d\varphi}\right)^2 + r^2} \, d\varphi & r = f(\varphi) \end{cases}$$