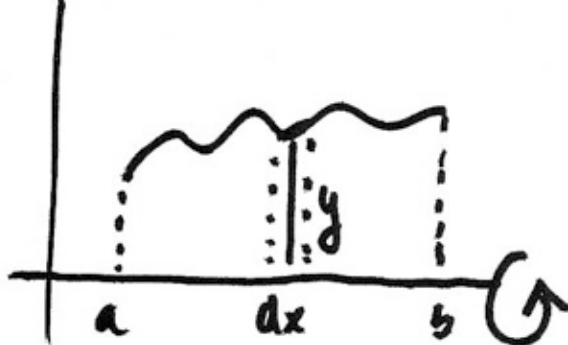


Surface area:

$$\text{(curve } \begin{cases} x = f(t) \\ y = g(t) \end{cases} \quad t_0 \leq t \leq t_1$$



rotated about the x-axis)

$$S = 2\pi \int_a^b (\text{radius}) ds = 2\pi \int_a^b y ds$$

$$= 2\pi \int_{t_0}^{t_1} g(t) \sqrt{[f'(t)]^2 + [g'(t)]^2} dt$$

$$\text{Example: } \begin{cases} x = r t - r \sin t \\ y = r - r \cos t \end{cases} : 0 \leq t \leq 2\pi.$$