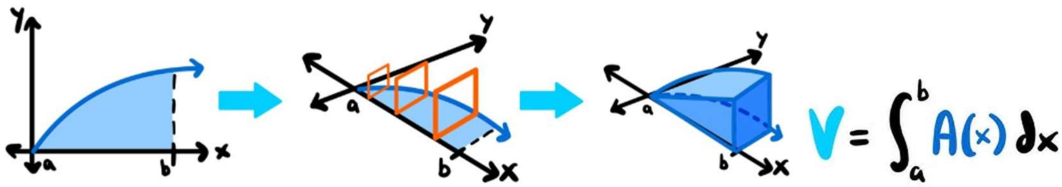
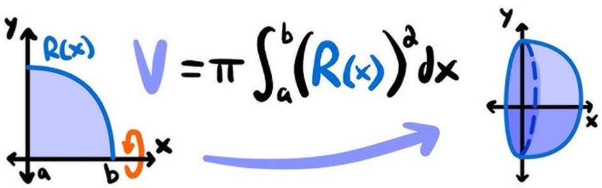
VOLUME OF KNOWN CROSS SECTIONS



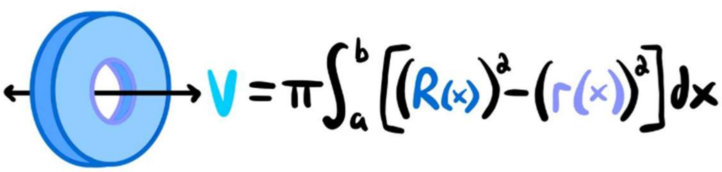

Area modeled by the function A(x)

DISK METHOD



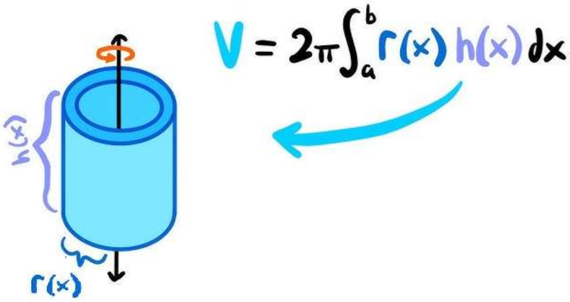

The Radius could also be R(x) = f(x) – c, the function revolving around an axis y = c, which would be different than the x axis

WASHER METHOD



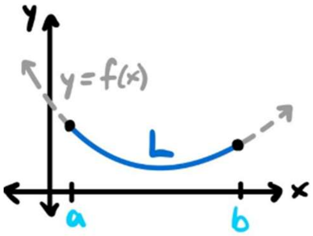

The Radii could also be R(x) = f(x) – c, r(x) = g(x) – c, if both are revolving around an axis y = c, which would be different than the x axis

SHELL METHOD




Here, the height of the cylinder is the difference between the two functions, h(x) = f(x) – g(x), while the radius would be: r(x) = x – c, in case the axis of rotation is not the origin (in which case r(x) = x), but an axis x = c

ARC LENGTH

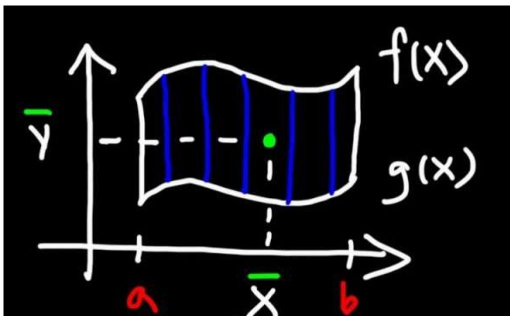



$$L = \int_a^b \sqrt{1 + \left(f'(x)\right)^2}\, dx$$

AREA OF SURFACES OF REVOLUTION


$$S = 2\pi \int_a^b f(x) \sqrt{1 + \left(f'(x)\right)^2}\, dx$$

CENTROIDS

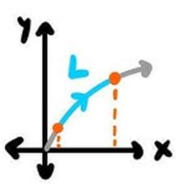



$$A = \int_a^b [f(x) - g(x)]\, dx$$

$$\bar{x} = \frac{1}{A} \int_a^b x[f(x) - g(x)]\, dx$$

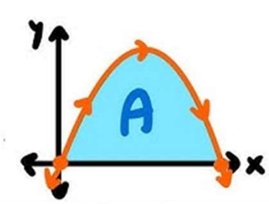
$$\bar{y} = \frac{1}{A} \int_a^b \frac{1}{2}[f^2(x) - g^2(x)]\, dx$$

ARC LENGTH OF PARAMETRIC EQUATIONS




$$L = \int_{t_1}^{t_2} \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2}\, dt$$

AREA UNDER PARAMETRIC EQUATIONS




$$A = \int_{t_1}^{t_2} g(t) f'(t)\, dt$$