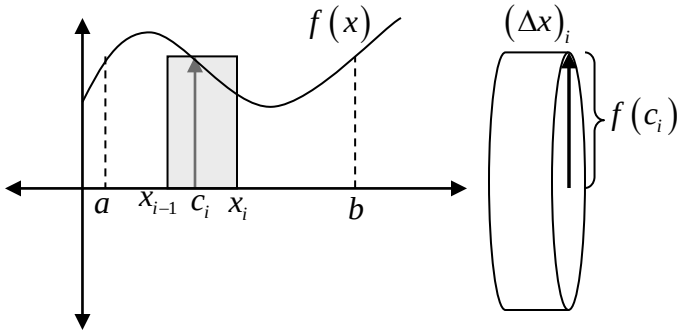


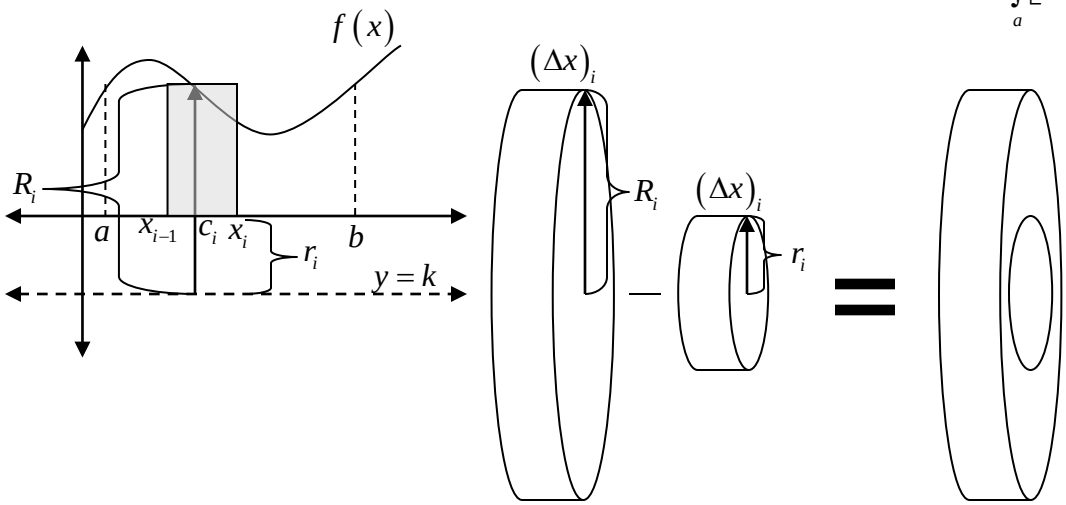
$$V_{\text{slice}} = \pi\left(f\left(c_i\right)\right)^2\left(\Delta x\right)_i$$

$$V_{\text{solid}} \approx \sum_{i=1}^{n} \pi\left(f\left(c_i\right)\right)^2\left(\Delta x\right)_i$$

$$= \lim_{\|\Delta\|\to 0} \sum_{i=1}^{n} \pi\left(f\left(c_i\right)\right)^2\left(\Delta x\right)_i$$

$$= \int_a^b \pi\left[f\left(x\right)\right]^2 dx$$

$$= \pi\int_a^b \left[f\left(x\right)\right]^2 dx$$



$$V = \pi\left(R_i\right)^2\left(\Delta x\right)_i \qquad V = \pi\left(r_i\right)^2\left(\Delta x\right)_i \qquad V = \pi\left(R_i\right)^2\left(\Delta x\right)_i - \pi\left(r_i\right)^2\left(\Delta x\right)_i$$

$$= \pi\left(f\left(x\right)-k\right)^2\left(\Delta x\right)_i \qquad = \pi\left(0-k\right)^2\left(\Delta x\right)_i \qquad = \pi\left(f\left(x\right)-k\right)^2\left(\Delta x\right)_i - \pi\left(0-k\right)^2\left(\Delta x\right)_i$$

$$V_{\text{slice}} = \pi\left(R_i\right)^2\left(\Delta x\right)_i - \pi\left(r_i\right)^2\left(\Delta x\right)_i$$

$$= \pi\left(f\left(x\right)-k\right)^2\left(\Delta x\right)_i - \pi\left(0-k\right)^2\left(\Delta x\right)_i$$

$$\downarrow$$

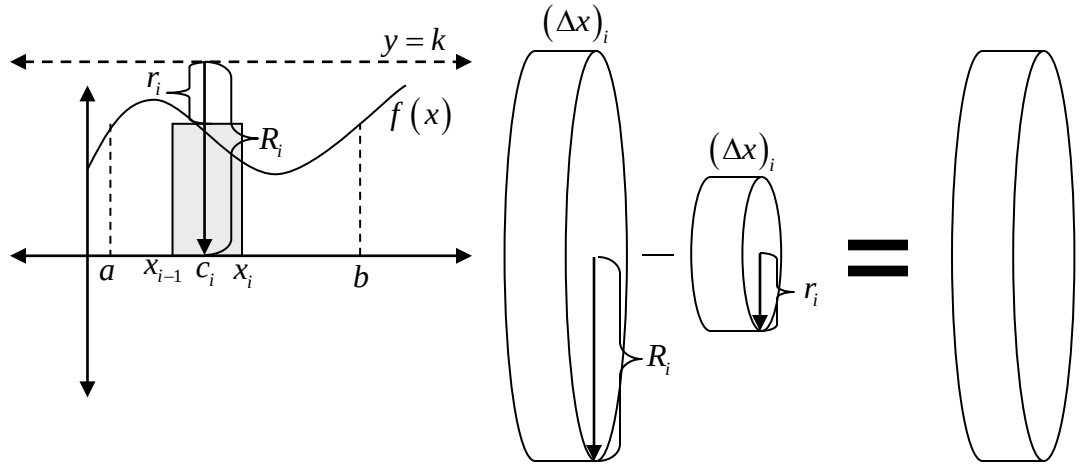
$$V_{\text{solid}} \approx \sum_{i=1}^{n} \pi\left(f\left(x\right)-k\right)^2\left(\Delta x\right)_i - \pi\left(0-k\right)^2\left(\Delta x\right)_i$$

$$= \lim_{\|\Delta\|\to 0} \sum_{i=1}^{n} \pi\left(f\left(x\right)-k\right)^2\left(\Delta x\right)_i - \pi\left(0-k\right)^2\left(\Delta x\right)_i$$

$$= \lim_{\|\Delta\|\to 0} \pi\sum_{i=1}^{n} \left(f\left(x\right)-k\right)^2\left(\Delta x\right)_i - \left(0-k\right)^2\left(\Delta x\right)_i$$

$$= \lim_{\|\Delta\|\to 0} \pi\sum_{i=1}^{n} \left(f\left(x\right)-k\right)^2 - \left(0-k\right)^2\left(\Delta x\right)_i$$

$$= \pi\int_a^b \left(f\left(x\right)-k\right)^2 - \left(0-k\right)^2 dx$$

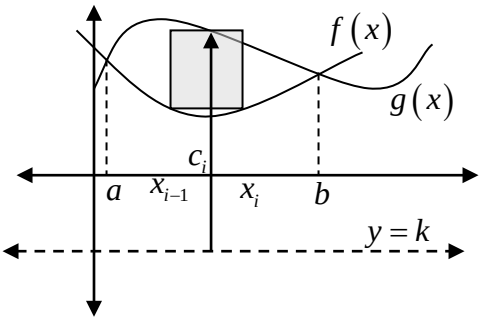


$$V=\pi\left(R_i\right)^2\left(\Delta x\right)_i \qquad V=\pi\left(r_i\right)^2\left(\Delta x\right)_i \qquad V=\pi\left(R_i\right)^2\left(\Delta x\right)_i-\pi\left(r_i\right)^2\left(\Delta x\right)_i$$

$$=\pi\left(k-0\right)^2\left(\Delta x\right)_i \qquad =\pi\left(k-f\left(c_i\right)\right)^2\left(\Delta x\right)_i \qquad =\pi\left(k-0\right)^2\left(\Delta x\right)_i-\pi\left(k-f\left(c_i\right)\right)^2\left(\Delta x\right)_i$$

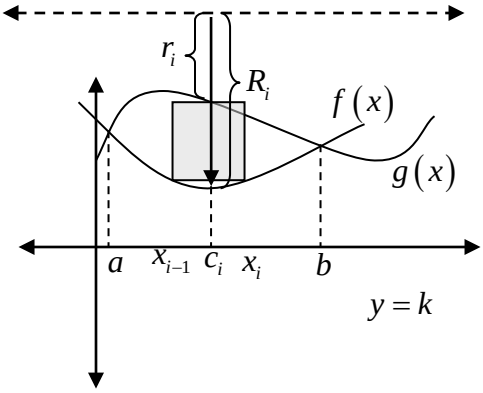
$$\begin{aligned}V_{\text{slice}}&=\pi\left(R_i\right)^2\left(\Delta x\right)_i-\pi\left(r_i\right)^2\left(\Delta x\right)_i\\&=\pi\left(k-0\right)^2\left(\Delta x\right)_i-\pi\left(k-f\left(x\right)\right)^2\left(\Delta x\right)_i\end{aligned}$$

$$V_{\text{solid}}=\pi\int_a^b\left(k-0\right)^2-\left(k-f\left(x\right)\right)dx$$



$$\begin{aligned}V_{\text{slice}}&=\pi\left(R_i\right)^2\left(\Delta x\right)_i-\pi\left(r_i\right)^2\left(\Delta x\right)_i\\&=\pi\left(g\left(c_i\right)-k\right)^2\left(\Delta x\right)_i-\pi\left(f\left(c_i\right)-k\right)^2\left(\Delta x\right)_i\end{aligned}$$

$$V_{\text{solid}}=\pi\int_a^b\left(g\left(x\right)-k\right)^2-\left(f\left(x\right)-k\right)^2dx$$



$$\begin{aligned}V_{\text{slice}}&=\pi\left(R_i\right)^2\left(\Delta x\right)_i-\pi\left(r_i\right)^2\left(\Delta x\right)_i\\&=\pi\left(f\left(c_i\right)-k\right)^2\left(\Delta x\right)_i-\pi\left(g\left(c_i\right)-k\right)^2\left(\Delta x\right)_i\end{aligned}$$

$$V_{\text{solid}}=\pi\int_a^b\left(f\left(x\right)-k\right)^2-\left(g\left(x\right)-k\right)^2dx$$