$a = 3$

$b = 7$

$f(x) = x^3$

$F(x) = \dfrac{x^3 + 1}{3 + 1} = \dfrac{x^4}{4}$

$x = 3 : F(3) = \dfrac{3^4}{4} = \dfrac{81}{4}$

$x = 7 : F(7) = \dfrac{7^4}{4} = \dfrac{2401}{4}$

$\dfrac{2401}{4} - \dfrac{81}{4} = \dfrac{2320}{4} = 580$

$\displaystyle\int_a^b f(x)\,dx = 580$

$V = \pi \displaystyle\int_a^b [f(x)]^2 = \pi \int_a^b x^6\,dx$

$F(x) = \dfrac{x^{6+1}}{6 + 1} = \dfrac{x^7}{7}$

if $\quad x = 3 : F(3) = \dfrac{3^7}{7} = \dfrac{2187}{7} = 312.42$

if $\quad x = 7 : F(7) = \dfrac{7^7}{7} = \dfrac{823543}{7} = 117649$

$117649 - 312.42 = 117336.58$

$\pi \times 117336.58 = 368623.738$

$V = 368623.738$

Asuming f(x) is in meters then the total volume $= Vm^3$

If $f(x) = x^n$ for Definite Integral

1. Setup the integral as $\int_a^b f(x)\,dx$
2. Find the antiderivatives, can use $F(x) = \frac{x^n+1}{n+1}$
3. Evaluate the integral $\int_a^b f(x)\,dx = F(b) - F(a)$

or $\int_a^b f(x)\,dx = \frac{b^n+1}{n+1} - \frac{a^n+1}{n+1}$

Just a little note $[f(x)]^2 iff f(x) = x^n then = x^{n\times 2}$

Calculate Volume $V = \pi \int_a^b [f(x)]^2\,dx$