Radius of big circle is: \(2-x^2\)

Radius of little circle is \(2-x\)

So \(A(x) = \text{area of big circle} - \text{area of little circle}\)

\[ = \pi(2-x^2)^2 - \pi(2-x)^2\]
Example 1

\[ y = x, \quad y = \sqrt{x} \quad \text{about} \quad x = 2 \]

Note horizontal cross sections are easier to think about than vertical (they are \( \bigcirc \)’s)
so instead do

\[ x = y, \quad x = y^2 \] about \( x = 2 \)

so want \( A(y) \) and

\[
\int_0^1 A(y) \, dy
\]
What does a cross section look like?

Big Radius: \(2-y^2\)
Little Radius \(2-y\)

\[ A(y) = \pi (2-y)^2 - \pi (2-y)^2 \]

Volume \( \int_{0}^{1} \pi [(2-y)^2 - (2-y)^2] \, dy \)
\[ \prod_i \int_0^1 \left[ (2-y^2) - (2-y) \right]^2 \, dy \\
\prod_i \int_0^1 \left[ 4 - 4y^2 + y^4 - \left( 4 - 4y + y^2 \right) \right] \, dy \]
line is \( \frac{b-a}{2h}x + \frac{a}{2} \)

So, area of square is \( 2 \left[ 2 \left( \frac{b-a}{2h}x + \frac{a}{2} \right) \right] \)

Volume \( \int_{-h}^{h} \left( 2 \left( \frac{b-a}{2h}x + \frac{a}{2} \right) \right)^2 \, dx \)