

## 2.2 Volume by Slicing Cont.

Friday, November 4, 2022

Objectives :

1. Find Volume of a solid of revolution
2. Disk method - Slicing method

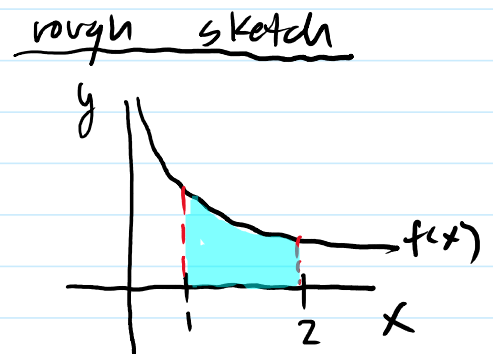
### The Disk Method

Let  $R$  be the region bounded above by the graph  $f(x)$ , below by the  $x$ -axis, on the left by the line  $x=a$ , and on the right  $x=b$ .

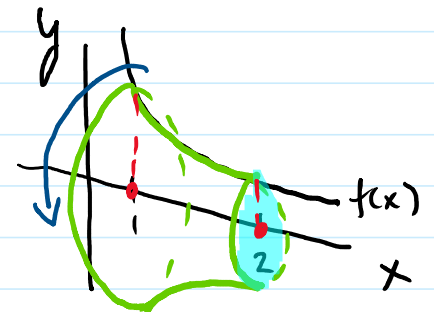
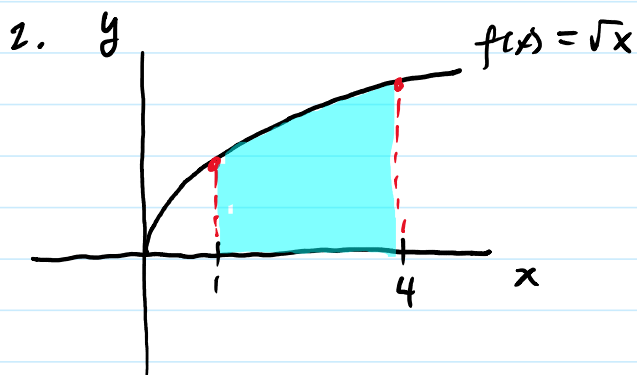
$$V = \int_a^b \pi [f(x)]^2 dx$$

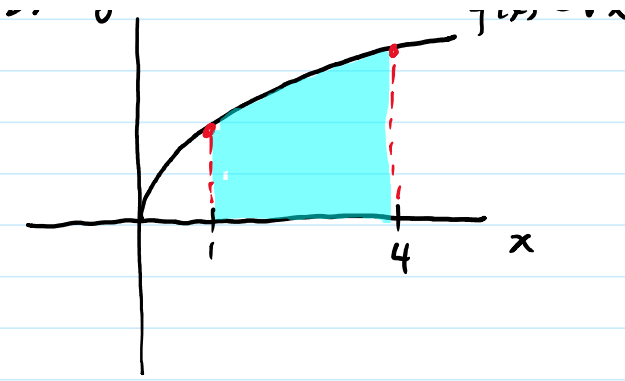
### Mini-Assignment Part 1

1. Find the volume of the solid defined by the function  $f(x) = \frac{1}{x}$  revolved around the  $x$ -axis over the interval  $[1, 2]$ .



2. sketch the solid with axis labels.  
b. Set-up and solve the integral.

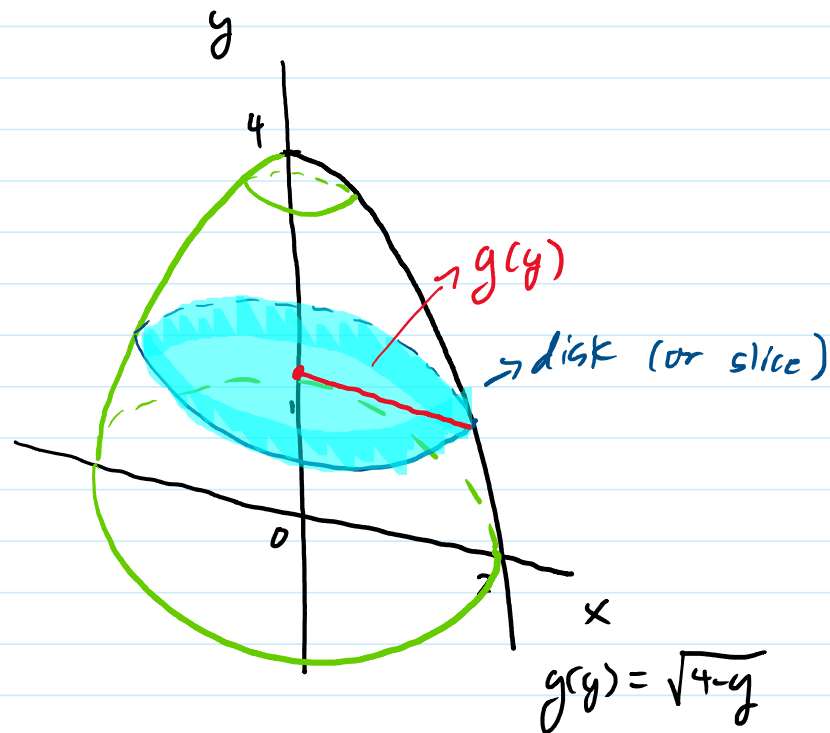
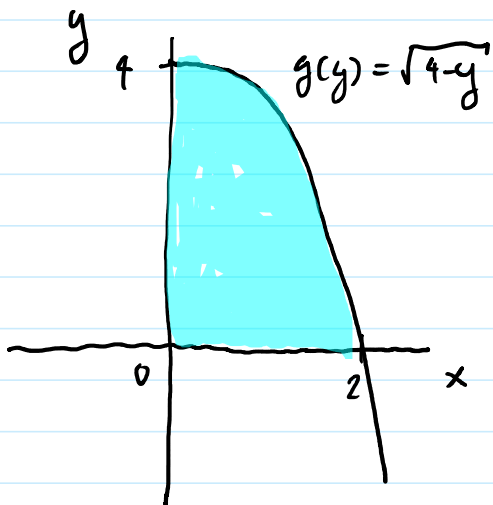




1. Sketch the solid of revolution of the given function above.
2. Find the volume of the solid.
3. Use the disk method to find the volume of the solid of revolution by rotating the region between the graph of  $f(x) = \sqrt{4-x}$  and the x-axis over the interval  $[0, 4]$  around the x-axis. Sketch the solid of revolution.

### Disk method for solids of revolution around the y-axis

Example:



$$\begin{aligned}
 V &= \int_0^4 \pi (\sqrt{4-y})^2 dy \\
 &= \pi \int_0^4 (4-y) dy \\
 &= \pi \left( 4y - \frac{y^2}{2} \right) \Big|_0^4 \\
 V &= 8\pi
 \end{aligned}$$

### Mini-Assignment Part 2

4. Use the disc method to find the volume of the solid of revolution generated by rotating the region between  $g(y) = y$  and the  $y$ -axis over the interval  $[1, 4]$  around the  $y$ -axis. Sketch the solid of revolution.