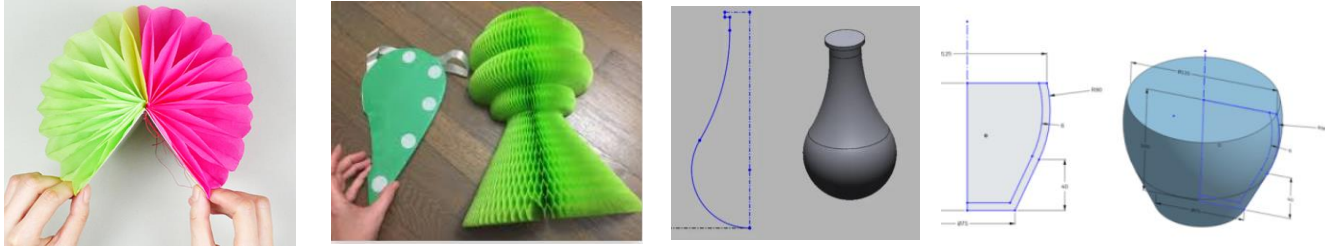


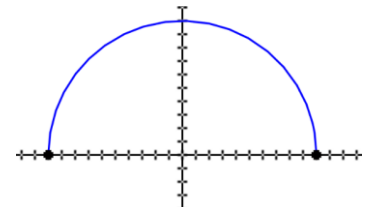
Volume Using Disk Method

Volume formed by revolving an area around an axis.

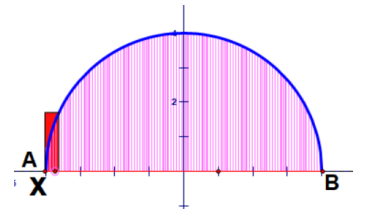


Finding the Volume of a Solid Using the Disk Method

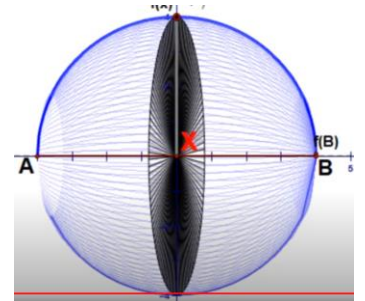
Sketch the area between $y = \sqrt{4 - x^2}$ and the x -axis.



Recall that area under the curve was adding rectangles (Riemann)



But we need volume,
so take the rectangles and spin around the x -axis.



Add up the disks to get...

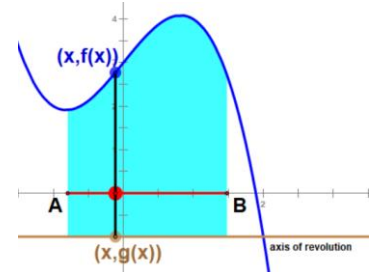
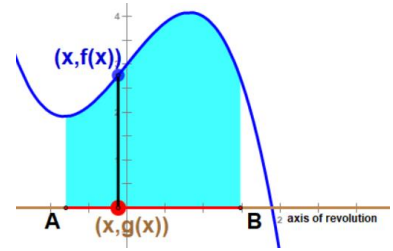


An infinite # of disks...

Volume of a Solid Disk Method

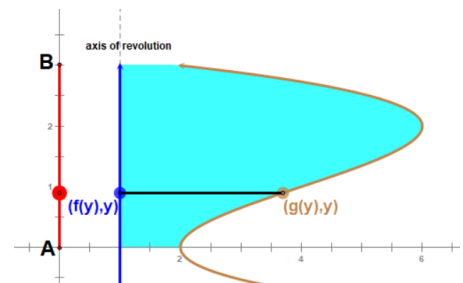
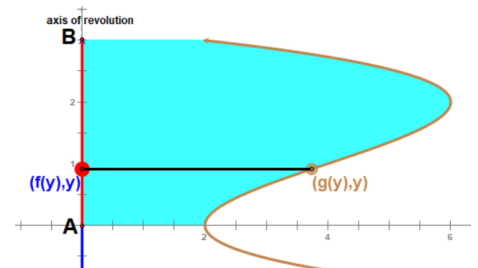
Revolve around an x -axis (or a horizontal axis)

$$\text{Volume} = \pi \int_a^b (R(x))^2 dx$$



Revolve around a y -axis (or a vertical axis)

$$\text{Volume} = \pi \int_c^d (R(y))^2 dy$$



Example 1:

Find the volume of the solid formed by rotating the region in Quadrant I bounded by $y = 4 - x^2$, the x -axis, and the y -axis about the x -axis.

Example 2:

Find the volume of the solid formed by rotating the region in Quadrant I bounded by $y = 4 - x^2$, the x -axis, and the y -axis about the y -axis.

Example 3:

Find the volume of the solid formed by rotating the region bounded by $y = x^3$, $y = 1$, and $x = 0$ about the line $y = 1$.

Example 4:

Find the volume of the solid formed by rotating the region bounded by $y = x^3$, $y = 0$, and $x = 1$ about the line $x = 1$.