

Disk Method for Volume

p. 447 - 457 (6.2)

75

If the solid revolves around a horizontal axis and is flush up against the line of rotation, then the volume is found by

$$V = \int_a^b \pi r^2 dx.$$

If the solid revolves around a vertical axis and is flush up against the line of rotation, then the volume is found by

$$V = \int_c^d \pi r^2 dy.$$

Steps for Disk Method

1. Draw region.
2. Find limits.
3. Find radius to set up integral.
4. Integrate and evaluate.

**1. The region enclosed by the x -axis, the line $x = 3$, and the curve $y = \sqrt{x}$ is rotated about the x -axis. What is the volume of the solid generated? (without a calculator)

2. Find the volume of the solid generated by revolving $x = \sqrt{1 + y}$ with $y = 3$ and $x = 0$ about the y -axis. (with and without a calculator)

Notes on Volume - Disk Method

1. Find the volume of the solid generated by revolving $y = x^3$ with $y = 0$ and $x = 2$ about the x -axis.
2. Find the volume bounded by the x -axis, $y = x^2 + 1$, and $x = -1$, $x = 1$ revolved about the x -axis.
3. Find the volume of the solid generated by revolving $y = \frac{1}{x}$ $y = 1$, $y = 3$, and $x = 0$ about the y -axis.