8.9 / Practice workbook

Volume with Disc Method: Revolving Around the x- or y-Axis

Practice

Problems 1–6 / Show your reasoning

1 The region under $y = \sqrt{x}$ for $0 \le x \le 4$ is revolved around the x-axis. Find the volume.

2 The region under $y = x^2$ for $0 \le x \le 1$ is revolved around the x-axis. What is the volume?

A. $\frac{\pi}{5}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{2}$

D. $\frac{2\pi}{5}$

3 The region under $y = \frac{1}{x}$ for $1 \le x \le 3$ is revolved around the x-axis. Find the volume.

4 The region bounded by $y = x^3$, $y = 8$, and the y-axis is revolved around the y-axis. Find the volume.

8.9 / AP-style free response

Problem 5 ➤ */ Show the work and the reasons a grader looks for.*

R is the region under $y = \dfrac{2}{\sqrt{x+1}}$ and above the x-axis, for $0 \le x \le 3$.

(a) Find the area of R.

(b) Find the volume of the solid generated when R is revolved around the x-axis.

6 The region in the first quadrant bounded by $y = 9 - x^2$ and the axes is revolved around the y-axis. Find the volume.

8.9 / Answer key

Volume with Disc Method: Revolving Around the x- or y-Axis

1 8π

2 (A)

3 $\frac{2\pi}{3}$

4 $\frac{96\pi}{5}$

5 (a) 4; (b) $4\pi \ln 4 = 8\pi \ln 2$

6 $\frac{81\pi}{2}$