8.12 / Practice workbook

Volume with Washer Method: Revolving Around Other Axes

Practice

Problems 1–6 / Show your reasoning

1 The region between $y = x$ and $y = x^2$ is revolved around the line $y = -1$. Find the volume.

2 The same region, between $y = x$ and $y = x^2$, is revolved around the line $y = 2$. What is the volume?

A. $\frac{8\pi}{15}$

B. $\frac{7\pi}{15}$

C. $\frac{2\pi}{15}$

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

3 The region between $y = 4 - x^2$ and the x-axis is revolved around the line $y = -2$. Find the volume.

4 The region between $y = x^2$ and $y = 2x$ is revolved around the line $x = 3$. Find the volume.

8.12 / AP-style free response

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

R is the region between $y = x^2$ and $y = 4$. R is revolved around the line $y = -1$.

(a) Write, but do not evaluate, an integral expression for the volume of the solid.

(b) Find the volume of the solid.

6 The region bounded by $y = \sqrt{x}$, the x-axis, and $x = 4$ is revolved around the line $y = 3$. Find the volume.

8.12 / Answer key

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1 $\frac{7\pi}{15}$

2 (A)

3 $\frac{384\pi}{5}$

4 $\frac{16\pi}{3}$

5 (a) $\pi \int_{-2}^{2} \left(25 - (x^2+1)^2\right) dx$; (b) $\frac{1088\pi}{15}$

6 24π