8.8 / Practice workbook

Volumes with Cross Sections: Triangles and Semicircles

Practice

Problems 1–6 / Show your reasoning

1 The base is the triangle under $y = 3 - x$ in the first quadrant. Cross sections perpendicular to the x-axis are semicircles. Find the volume.

2 The base is the region under $y = \sqrt{x}$ for $0 \le x \le 4$. Cross sections perpendicular to the x-axis are equilateral triangles. What is the volume?

A. $2\sqrt{3}$
B. 8
C. $\sqrt{3}$
D. $4\sqrt{3}$

3 The base is the region between $y = 2x$ and $y = x^2$. Cross sections perpendicular to the x-axis are isosceles right triangles with a leg in the base. Find the volume.

4 The base is the region between $y = 1$ and $y = x^2$. Cross sections perpendicular to the x-axis are isosceles right triangles with the hypotenuse in the base. Find the volume.

8.8 / AP-style free response

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

The base of a solid is the region R between $y = \sqrt{x}$ and $y = \frac{x}{2}$.

(a) Cross sections perpendicular to the x-axis are semicircles. Find the volume of the solid.

(b) Cross sections perpendicular to the x-axis are equilateral triangles. Find the volume of the solid.

6 The base is the disk $x^2 + y^2 \leq 1$. Cross sections perpendicular to the x-axis are isosceles right triangles with the hypotenuse in the base. Find the volume.

8.8 / Answer key

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1 $\frac{9\pi}{8}$

2 (A)

3 $\frac{8}{15}$

4 $\frac{4}{15}$

5 (a) $\frac{\pi}{15}$; (b) $\frac{2\sqrt{3}}{15}$

6 $\frac{4}{3}$