

1. Let R be the region bounded by the graphs of $y = \sin(\pi x)$ and $y = x^3 - 4x$, as shown in the figure above.
- Find the area of R .
 - The horizontal line $y = -2$ splits the region R into two parts. Write, but do not evaluate, an integral expression for the area of the part of R that is below this horizontal line.
 - The region R is the base of a solid. For this solid, each cross section perpendicular to the x -axis is a square. Find the volume of this solid.

Multiple Choice

No calc

2. The base of a solid is the region in the first quadrant bounded by the line $x = 2y + 4$ and the coordinate axes. What is the volume of the solid if every cross section perpendicular to the x -axis is a semicircle?

(A) $\frac{2\pi}{3}$ (B) $\frac{4\pi}{3}$ (C) $\frac{8\pi}{3}$ (D) $\frac{32\pi}{3}$ (E) $\frac{64\pi}{3}$

No calc

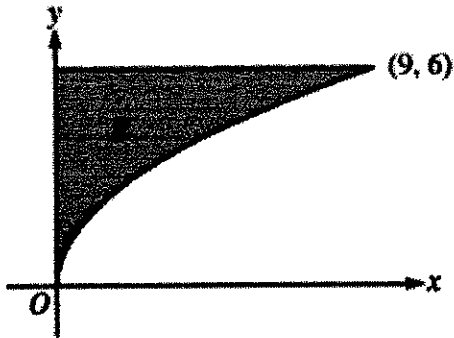
3. Let R be the region in the first quadrant bounded by the x -axis and the curve $y = 2x - x^2$. The volume produced when R is revolved about the x -axis is

(A) $\frac{16\pi}{15}$ (B) $\frac{8\pi}{3}$ (C) $\frac{4\pi}{3}$ (D) 16π (E) 8π

Yes Calc

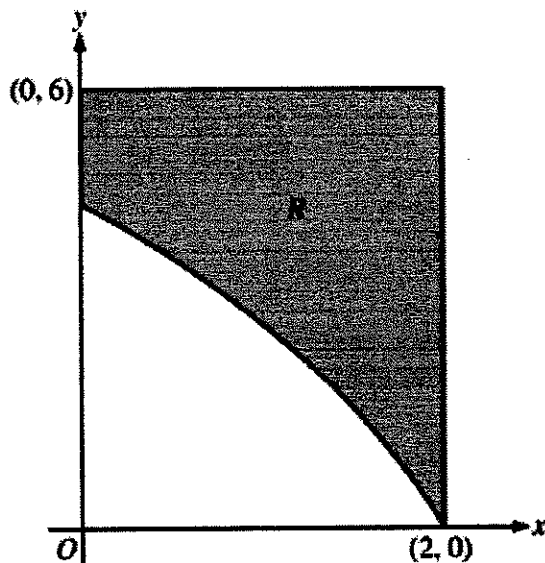
4. The base of a solid S is the region enclosed by the graph of $y = \sqrt{\ln x}$, the line $x = e$, and the x -axis. If the cross sections of S perpendicular to the x -axis are squares, then the volume of S is

(A) $\frac{1}{2}$ (B) $\frac{2}{3}$ (C) 1 (D) 2 (E) $\frac{1}{3}(e^3 - 1)$



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- Let R be the region in the first quadrant bounded by the graph of $y = 2\sqrt{x}$, the horizontal line $y = 6$, and the y -axis, as shown in the figure above.
- Find the area of R .
 - Write, but do not evaluate, an integral expression that gives the volume of the solid generated when R is rotated about the horizontal line $y = 7$.
 - Region R is the base of a solid. For each y , where $0 \leq y \leq 6$, the cross section of the solid taken perpendicular to the y -axis is a rectangle whose height is 3 times the length of its base in region R . Write, but do not evaluate, an integral expression that gives the volume of the solid.



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- In the figure above, R is the shaded region in the first quadrant bounded by the graph of $y = 4\ln(3 - x)$, the horizontal line $y = 6$, and the vertical line $x = 2$.
- Find the area of R .
 - Find the volume of the solid generated when R is revolved about the horizontal line $y = 8$.
 - The region R is the base of a solid. For this solid, each cross section perpendicular to the x -axis is a square. Find the volume of the solid.