

Classroom Voting Questions: Calculus II

Section 8.2 Applications to Geometry

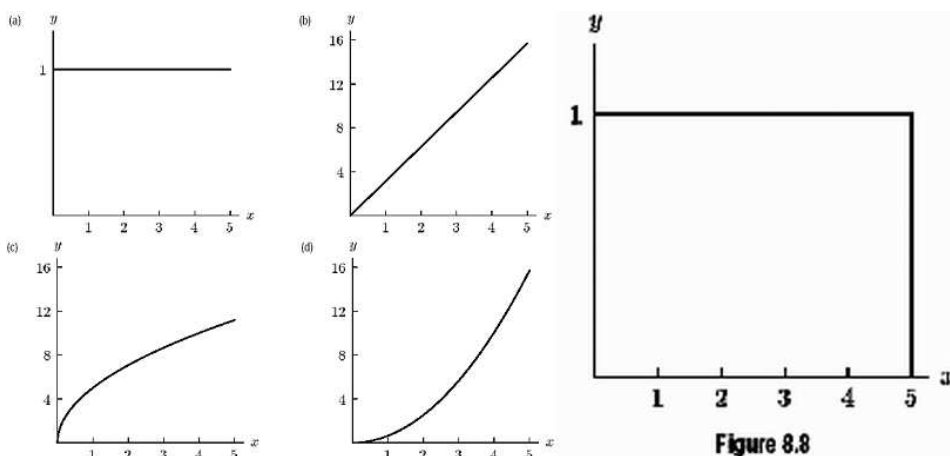
1. Find the area of the region R bounded by the graphs of $f(x) = x^2$ and $g(x) = \sqrt{x}$.

- (a) $\frac{1}{3}$
- (b) $\frac{7}{6}$
- (c) $-\frac{1}{3}$
- (d) None of the above

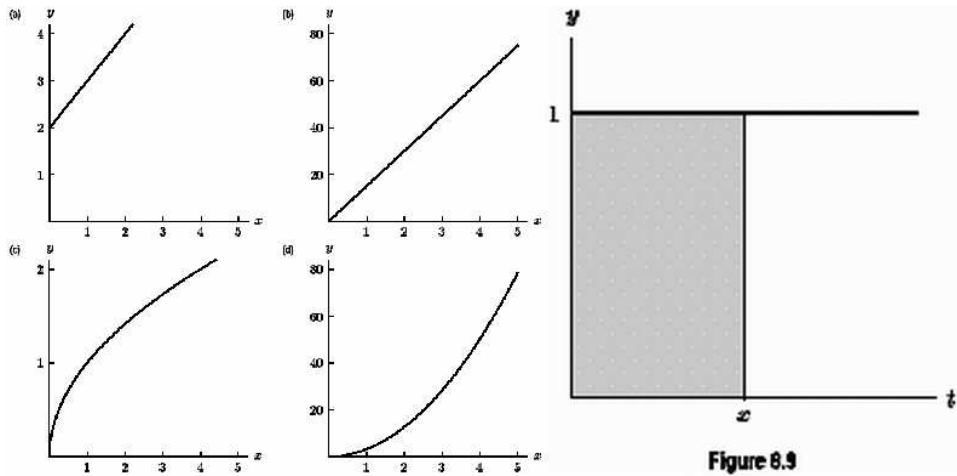
2. **True or False** The volume of the solid of revolution is the same whether a region is revolved around the x -axis or the y -axis.

- (a) True, and I am very confident
- (b) True, but I am not very confident
- (c) False, but I am not very confident
- (d) False, and I am very confident

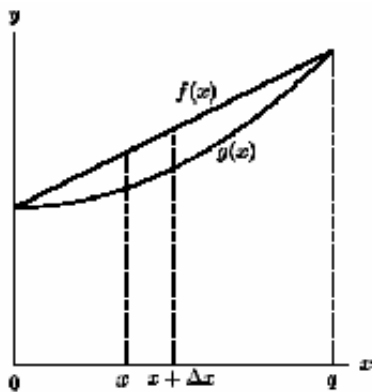
3. Imagine taking the enclosed region in Figure 8.8 and rotating it about the x -axis. Which of the following graphs (a)-(d) represents the resulting volume as a function of x ?



4. Imagine taking the enclosed region in Figure 8.9 and rotating it about the y -axis. Which of the following graphs (a)-(d) represents the resulting volume as a function of x ?



5. Imagine that the region between the graphs of f and g in Figure 8.10 is rotated about the x -axis to form a solid. Which of the following represents the volume of this solid?



- (a) $\int_0^q 2\pi x(f(x) - g(x))dx$
 (b) $\int_0^q (f(x) - g(x))dx$
 (c) $\int_0^q \pi(f(x) - g(x))^2 dx$
 (d) $\int_0^q (\pi f^2(x) - \pi g^2(x))dx$
 (e) $\int_0^q \pi x(f(x) - g(x))dx$

6. Imagine rotating the enclosed region in Figure 8.11 about three lines separately: the x -axis, the y -axis, and the vertical line at $x = 6$. This produces three different volumes. Which of the following lists those volumes in order from largest to smallest?

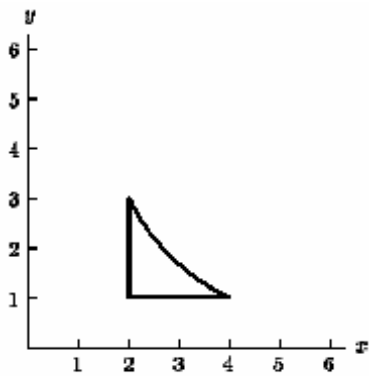


Figure 8.11

- (a) x -axis; $x = 6$; y -axis
- (b) y -axis; $x = 6$; x -axis
- (c) $x = 6$; y -axis; x -axis
- (d) $x = 6$; x -axis; y -axis
- (e) x -axis; y -axis; $x = 6$
- (f) y -axis; x -axis; $x = 6$

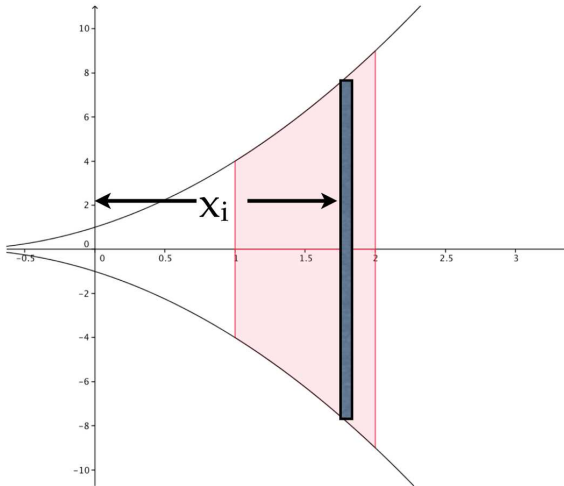
7. Let R be the region bounded by the graph of $f(x) = x$, the line $x = 1$, and the x -axis. True or false: The volume of the solid generated when R is revolved about the line $x = 3$ is given by $\int_0^1 2\pi x(3 - x)dx$.

- (a) True, and I am very confident.
- (b) True, but I am not very confident.
- (c) False, but I am not very confident.
- (d) False, and am very confident.

8. Let R be the region bounded by the graph of $y = x$, the line $y = 1$, and the y -axis. If the shell method is used to determine the volume of the solid generated when R is revolved about the y -axis, what integral is obtained?

- (a) $\int_0^1 \pi y^2 dy$
- (b) $\int_0^1 2\pi x^2 dx$
- (c) $\int_0^1 2\pi x(1 - x) dx$
- (d) None of the above

9. The figure below shows the graph of $y = (x + 1)^2$ rotated around the x -axis.



The volume of the approximating slice that is x_i units away from the origin is

- (a) $\pi \frac{81x_i^2}{4} \Delta x$
 (b) $\pi x_i^2 \Delta x$
 (c) $\pi (x_i + 1)^2 \Delta x$
 (d) $\pi (x_i + 1)^4 \Delta x$
10. An integral that would calculate the volume of the solid obtained by revolving the graph of $y = (x + 1)^2$ from $x = 1$ to $x = 2$ around the y -axis is:
- (a) $\int_1^2 \pi (\sqrt{x} - 1)^2 dx$
 (b) $\int_4^9 \pi (x + 1)^4 dx$
 (c) $\int_1^2 \pi (\sqrt{y} - 1)^2 dy$
 (d) $\int_4^9 \pi (\sqrt{y} - 1)^2 dy$
11. The length of the graph of $y = \sin(x^2)$ from $x = 0$ to $x = 2\pi$ is calculated by
- (a) $\int_0^{2\pi} (1 + \sin(x^2)) dx$
 (b) $\int_0^{2\pi} \sqrt{1 + \sin(x^2)} dx$
 (c) $\int_0^{2\pi} \sqrt{1 + (2x \sin(x^2))^2} dx$
 (d) $\int_0^{2\pi} \sqrt{1 + (2x \cos(x^2))^2} dx$