

1. The area of the region enclosed by $y = e^{x^2} - 2$ and $y = \sqrt{4 - x^2}$ is given by
- (a) 2.525 (b) 4.049 (c) 4.328
- (d) 5.050 (e) 6.289
-

2. The length of a curve $y = f(x)$ between $x = a$ to $x = b$ is given by $\int_a^b \sqrt{e^{2x} + 2e^x + 2} dx$. Therefore, $f(x) =$

- (a) $2e^{2x} + 2e^x$ (b) $\frac{1}{2}e^{2x} + 2e^x + 2x$
- (c) $e^x - x + 3$ (d) $e^x + 1$
- (e) $e^x + x - 2$
-

3. Let R be the region in the first quadrant bounded by $y = (x-3)^2$, $y=0$ and $x=0$. What is the volume of the solid generated when R is rotated about the x -axis?

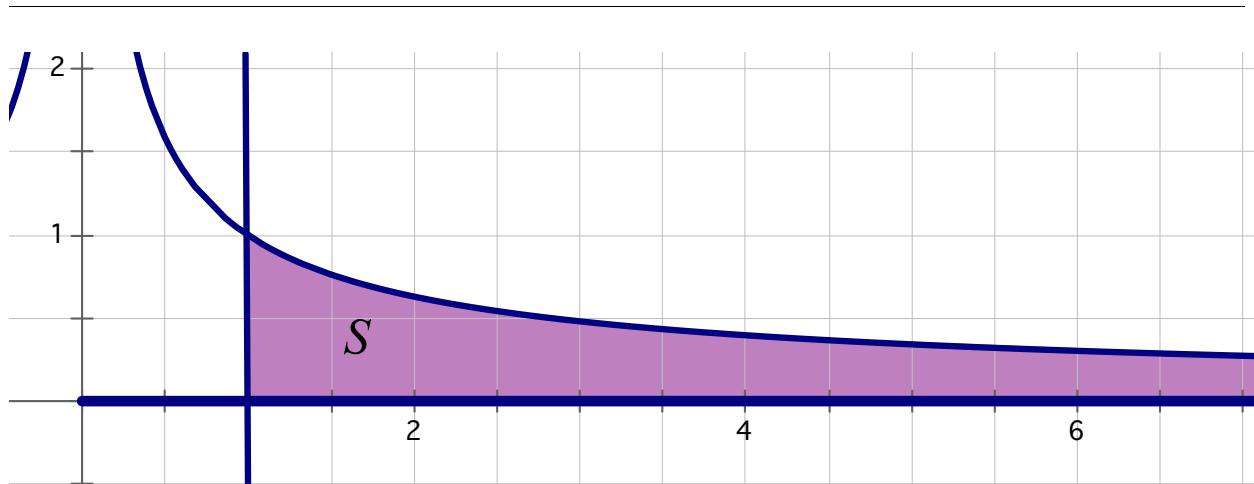
a) $\pi \int_0^3 (x-3)^2 dx$

b) $\pi \int_0^3 (x-3)^4 dx$

c) $2\pi \int_0^3 (x-3)^2 dx$

d) $2\pi \int_0^3 x(x-3)^2 dx$

e) $2\pi \int_0^3 x(x-3)^4 dx$



4. The region S (shown above) is bounded by $y = \frac{1}{\sqrt[3]{x^2}}$, the x -axis, and the line $x=1$. There is not upper bound (i.e., $x \rightarrow \infty$) A solid is formed by revolving region S about the x -axis. The volume of the solid is

a) 0 b) 1 c) π d) undefined

e) none of the above

5. Let R be the region in the first quadrant bounded by $x = \sin^{-1} y$, the x -axis, and $x = \frac{\pi}{2}$. Which of the following integrals gives the volume of the solid generated when R is rotated about the x -axis?

(a) $\pi \int_0^{\pi/2} y^2 dy$ (b) $\pi \int_0^1 (\sin^{-1} y)^2 dy$

(c) $\pi \int_0^{\pi/2} (\sin^{-1} y)^2 dy$ (d) $\pi \int_0^1 (\sin x)^2 dx$

(e) $\pi \int_0^{\pi/2} (\sin x)^2 dx$

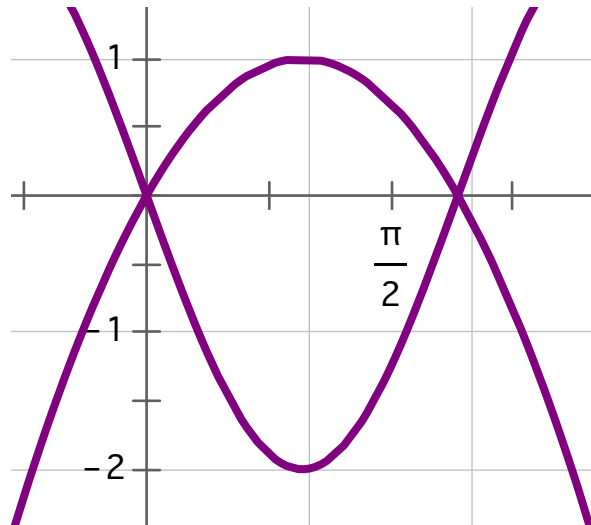
6. The base of a solid is the region enclosed by $y = (x - 3)^2$ in Quadrant I. If each cross-section of the solid perpendicular to the x -axis is a square, the volume of the solid is

- a) 9 b) 9π c) 27.3 d) 48.6 e) 48.6π
-

7. Let T be the region bounded by $y = -2x^3$ and $y = \sqrt{-8x}$.

a) Find the volume of the solid generated when T is rotated about the x – axis. Show the anti-differentiation steps.

b) Find the volume of the solid generated when T is rotated about the y – axis. Show the anti-differentiation steps.

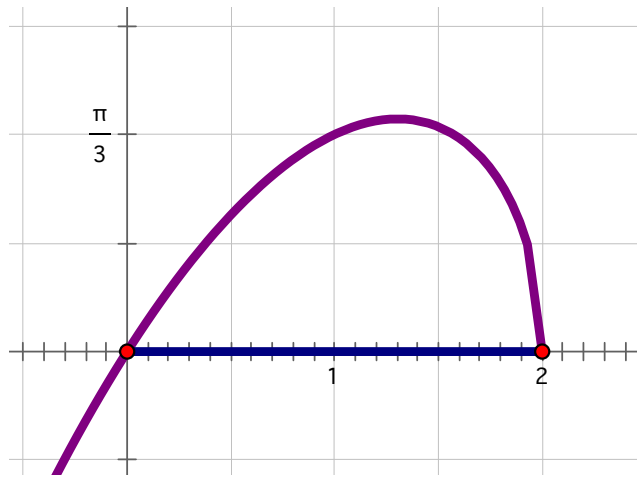


8. Let S be the region shown above bounded above by the graph of $y = -2\sin\left(\frac{\pi}{2}x\right)$ and below the graph of $y = 2x - x^2$.

a) Find the volume of the solid generated when S is revolved about the line $y = 2$.

b) Let the base of the solid be the region S. Find the volume of the solid where the cross-sections perpendicular to the x -axis are rectangles that are three times as tall as they are wide.

9. Let Q be the region bounded by $y = x \cos^{-1}\left(\frac{x}{2}\right)$, and $x = 0$.



- a) Find the volume of the solid generated when R is rotated about the line $y = -2$.
-

b) Find $\frac{dy}{dx}$.

c) Find the perimeter of region Q .
