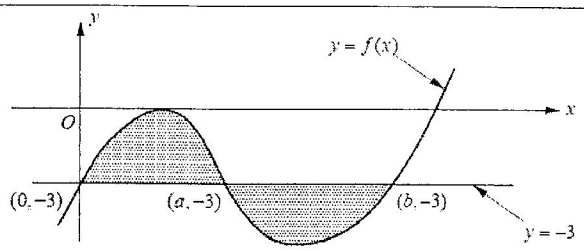
Area & Volume Practice

1. What is the area of the region in the first quadrant, bounded by the curve $y = \sqrt[3]{x}$ and $y = x$?

(A) $\frac{1}{5}$ (B) $\frac{1}{4}$ (C) $\frac{1}{3}$ (D) $\frac{1}{2}$

2.



The curve $y = f(x)$ and the line $y = -3$, shown in the figure above, intersect at the points $(0,-3)$, $(a,-3)$, and $(b,-3)$. The sum of area of the shaded region enclosed by the curve and the line is given by

(A) $\int_0^a [3 - f(x)]\,dx + \int_a^b [-3 + f(x)]\,dx$

(B) $\int_0^a [-3 + f(x)]\,dx + \int_a^b [3 - f(x)]\,dx$

(C) $\int_0^a [f(x) + 3]\,dx + \int_a^b [-3 - f(x)]\,dx$

(D) $\int_0^a [f(x) - 3]\,dx + \int_a^b [3 - f(x)]\,dx$

3. The region in the first quadrant bounded by the graph of $y = \sec x$, $x = \frac{\pi}{3}$, and the coordinate axes is rotated about the x-axis. What is the volume of the solid generated?

(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{2}$ (C) $\sqrt{3}\pi$ (D) 3π

4. The volume of the solid generated by revolving the region bounded by the graphs of $y = \sqrt{x}$, $y = 2$, and y-axis about the y-axis is

(A) $\frac{32}{5}\pi$ (B) $\frac{16}{3}\pi$ (C) $\frac{10}{3}\pi$ (D) $\frac{8}{3}\pi$

5. The region R is enclosed by the graph of $y = \sqrt{x+1}$, the line $y = x - 1$, and the y-axis. The volume of the solid generated when is R rotated about the line $y = 2$ is

(A) $\frac{13}{2}\pi$ (B) $\frac{20}{3}\pi$ (C) $\frac{49}{6}\pi$ (D) 9π

6. The base of a solid is the region enclosed by the graph of $y = e^x$, the coordinate axes, and the line $x = 1$. If the cross sections of the solid perpendicular to the x-axis are squares, what is the volume of the solid?

(A) $\frac{e^2}{4}$ (B) $\frac{e^2 - 1}{2}$ (C) $\frac{e^2 + 1}{2}$ (D) $e^2 - \frac{1}{2}$

7. The base of a solid S is the semicircular region enclosed by the graph of $y = \sqrt{9 - x^2}$ and the x-axis. If the cross sections of S perpendicular to the x-axis are semicircles, what is the volume of the solid?

(A) $\frac{20\pi}{3}$ (B) 6π (C) $\frac{9\pi}{2}$ (D) $\frac{7\pi}{2}$

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

(A) $\int_0^2 (4 - y^2)^2 \, dy$ (C) $\int_0^2 \left[(2 - y)^2\right]^2 \, dy$

(B) $\int_0^2 (4 - y)^2 \, dy$ (D) $\int_0^4 \left[(2 - y)^2\right]^2 \, dy$