

AP Calculus Homework 15

Please write your answer on a separate piece of paper and submit it on Classkick or write your answer directly on Classkick.

Please write all answers in exact forms. For example, write π instead of 3.14.

Questions with a * are optional. Questions with ** are optional and more challenging.

1. Find the area of the region.

a) $x = 2y^2$, $x = 4 + y^2$ b) $x = 1 - y^2$, $x = y^2 - 1$

2. Find the volume of the solid obtained by rotating the region bounded by the given curves about the specified line.

a) $y = 2 - \frac{1}{2}x$, $y = 0$, $x = 1$, $x = 2$; about the x -axis

b) $y = 1 - x^2$, $y = 0$; about the x -axis

c) $y = 1/x$, $y = 0$, $x = 1$, $x = 2$; about the x -axis

d) $y = x^3$, $y = x$, $x \geq 0$; about the x -axis

e) $y = \frac{1}{4}x^2$, $y = 5 - x^2$; about the x -axis

3. The region in the first quadrant bounded by the graph of $y = \sec x$, $x = \frac{\pi}{4}$, and the axes is rotated about the x -axis. What is the volume of the solid generated?

(A) $\frac{\pi^2}{4}$ (B) $\pi - 1$ (C) π (D) 2π (E) $\frac{8\pi}{3}$

4. Let R be the region between the graphs of $y = 1$ and $y = \sin x$ from $x = 0$ to $x = \frac{\pi}{2}$. The volume of the solid obtained by revolving R about the x -axis is given by

(A) $2\pi \int_0^{\frac{\pi}{2}} x \sin x dx$ (B) $2\pi \int_0^{\frac{\pi}{2}} x \cos x dx$ (C) $\pi \int_0^{\frac{\pi}{2}} (1 - \sin x)^2 dx$

(D) $\pi \int_0^{\frac{\pi}{2}} \sin^2 x dx$ (E) $\pi \int_0^{\frac{\pi}{2}} (1 - \sin^2 x) dx$

5. The region enclosed by the x -axis, the line $x = 3$, and the curve $y = \sqrt{x}$ is rotated about the x -axis. What is the volume of the solid generated?

(A) 3π (B) $2\sqrt{3}\pi$ (C) $\frac{9}{2}\pi$ (D) 9π (E) $\frac{36\sqrt{3}}{5}\pi$