Review of Area & Volume
AP Calculus AB

1. Find the volume of the solid formed by rotating about the x-axis the region enclosed by the graphs of $y = \sqrt{x} + 1$, the x-axis, the y-axis, and the line x = 4. $\dfrac{68\pi}{3}$

2. Find the volume of the solid formed by rotating the region bounded by the graph of $y = \sqrt{x} + 1$, the y-axis, and the line y = 3 about the y-axis.   (calculator) $\dfrac{32\pi}{5}$

3. Find the area enclosed by the curve bounded by $f(x) = 5\sqrt{x}$, $g(x) = 4x - 6$ and the y-axis. $\dfrac{56}{3}$

4. Find the area enclosed by the curve bounded by f(x) = sinx, g(x) = cos x, and the y-axis over [0, π/4]. $\sqrt{2} - 1$

5. Find the area enclosed by the curve bounded by $f(x) = \sqrt{2 - x}$, $g(x) = x^3$, and the y-axis.   (calculator)   .969

6. Find the area enclosed by the curve bounded by $y = 3x^3$ and $x = 3y^2 - 5$.   (calculator)   8.680

7. Find the volume generated when $y = 15 - 2x - x^2$ is rotated about the x-axis on the interval [-5,3]. (calculator) $\dfrac{16384}{15}\pi$

8. The region bounded by the graphs $y = e^x, y = 1, and\ x = -1$ is rotated about the x-axis. Find the volume of the resulting solid. $\pi\left(\dfrac{1}{2} + \dfrac{1}{2e^2}\right)$

9. Find the volume generated when $f(x) = x^2 + 6\ and\ g(x) = 5x$ is enclosed by the y-axis and revolved about the x-axis. $\dfrac{656}{15}\pi$

10. Find the area between the curves x = e^y, x = y^2 -2 and the lines y = -1 and y = 1. $e - \dfrac{1}{e} + \dfrac{10}{3}$

11. A region is enclosed by the curves y = x and y = x^2.
    a. Find the volume of the solid if it is rotated around the x-axis. $2\pi/15$
    b. Find the volume if it is rotated about the line y = 2. $8\pi/15$
    c. Find the volume if it is rotated about the line x = -1. $\pi/2$

12. Find the volume of the solid obtained by rotating about the x-axis the region under the curve $y = \sqrt{x}$ from x = 0 to x = 1. $\pi/2$

13. Find the volume of the solid obtained by rotating the region bounded by $y = x^3$, y = 8 and x = 0 about the y-axis. $\dfrac{96\pi}{5}$

14. Find the volume of the solid obtained by rotating the region bounded by y = 3x, y = 2x, and y = 3 about the y-axis. $\dfrac{5\pi}{4}$

15. Find the volume of the solid obtained by rotating the region under the graph $f(x) = 9 - x^2$ from [0, 3] about the vertical axis x = -2. $\dfrac{225\pi}{2}$

16. Find the volume of S if the base of a solid S is the region enclosed by the graphs of $y = \sqrt{lnx}$, the line x = e, and the x-axis, and the cross sections of S perpendicular to the x-axis are squares.

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