Calculus Practice: Using Definite Integrals to Calculate Volume 9a

For each problem, find the volume of the specified solid.

1) The base of a solid is the region enclosed by $y = -\frac{x^2}{9} + 4$ and $y = 0$. Cross-sections perpendicular to the x-axis are rectangles with heights half that of the side in the xy-plane.

A) $\frac{4000}{3} \approx 1333.333$ B) $\frac{1372}{3} \approx 457.333$ C) $\frac{256}{5} = 51.2$ D) $\frac{64}{15} \approx 4.267$

2) The base of a solid is the region enclosed by the ellipse $\frac{x^2}{49} + \frac{y^2}{9} = 1$. Cross-sections perpendicular to the x-axis are rectangles with heights twice that of the side in the xy-plane.

A) 72 B) 672 C) $\frac{128\pi}{3} \approx 134.041$ D) 288

3) The base of a solid is the region enclosed by the semicircle $y = \sqrt{16 - x^2}$ and the x-axis. Cross-sections perpendicular to the x-axis are squares.

A) $\frac{16}{15} \approx 1.067$ B) $\frac{1024}{15} \approx 68.267$

C) $\frac{128\pi}{3} \approx 134.041$ D) $\frac{256}{3} \approx 85.333$

4) The base of a solid is the region enclosed by the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$. Cross-sections perpendicular to the x-axis are squares.

A) $\frac{5488}{3} \approx 1829.333$ B) 192 C) $\frac{8}{15} \approx 0.533$ D) 72

5) The base of a solid is the region enclosed by the circle $x^2 + y^2 = 49$. Cross-sections perpendicular to the x-axis are rectangles with heights half that of the side in the xy-plane.

A) 288 B) $\frac{2744}{3} \approx 914.667$ C) $\frac{1024}{3} \approx 341.333$ D) 784

6) The base of a solid is the region enclosed by the circle $x^2 + y^2 = 16$. Cross-sections perpendicular to the x-axis are semicircles.

A) $\frac{32\pi}{3} \approx 33.51$ B) $\frac{128\pi}{3} \approx 134.041$ C) $\frac{2\pi}{15} \approx 0.419$ D) 18

7) The base of a solid is the region enclosed by the circle $x^2 + y^2 = 49$. Cross-sections perpendicular to the x-axis are squares.

A) $\frac{250\pi}{3} \approx 261.799$ B) $\frac{128}{3} \approx 42.667$

C) $\frac{5488}{3} \approx 1829.333$ D) $\frac{32}{15} \approx 2.133$

8) The base of a solid is the region enclosed by the ellipse $\frac{x^2}{36} + \frac{y^2}{4} = 1$. Cross-sections perpendicular to the x-axis are rectangles with heights half that of the side in the xy-plane.

A) 64 B) $\frac{686}{3} \approx 228.667$ C) $\frac{343\pi}{6} \approx 179.594$ D) $\frac{16}{15} \approx 1.067$

9) The base of a solid is the region enclosed by $y = -x^2 + 1$ and $y = 0$. Cross-sections perpendicular to the x-axis are squares.

A) $\frac{500}{3} \approx 166.667$ B) $\frac{16}{15} \approx 1.067$ C) $\frac{9\pi}{2} \approx 14.137$ D) $\frac{1000}{3} \approx 333.333$

10) The base of a solid is the region enclosed by the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$. Cross-sections perpendicular to the x-axis are rectangles with heights half that of the side in the xy-plane.

A) 1152 B) 96 C) $\frac{1000}{3} \approx 333.333$ D) $72\pi \approx 226.195$

11) The base of a solid is the region enclosed by the circle $x^2 + y^2 = 49$. Cross-sections perpendicular to the x-axis are semicircles.

A) $\frac{32}{15} \approx 2.133$ B) 1152 C) $\frac{2048}{15} \approx 136.533$ D) $\frac{686\pi}{3} \approx 718.378$

12) The base of a solid is the region enclosed by $y = 4$ and $y = \frac{x^2}{4}$. Cross-sections perpendicular to the x-axis are rectangles with heights twice that of the side in the xy-plane.

A) 72 B) 576 C) $\frac{1024}{3} \approx 341.333$ D) $\frac{2048}{15} \approx 136.533$

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