Calculus Practice: Using Definite Integrals to Calculate Volume 11a

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

1) The base of a solid is the region enclosed by $y = 1$ and $y = \frac{x^2}{4}$. Cross-sections perpendicular to the y-axis are equilateral triangles.

A) $2\sqrt{3} \approx 3.464$ B) $\frac{1372}{3} \approx 457.333$ C) 72 D) 16

2) The base of a solid is the region enclosed by $y = 1$ and $y = \frac{x^2}{9}$. Cross-sections perpendicular to the y-axis are equilateral triangles.

A) 288 B) $\frac{9\sqrt{3}}{2} \approx 7.794$ C) $\frac{1000}{3} \approx 333.333$ D) $\frac{5488}{3} \approx 1829.333$

3) The base of a solid is the region enclosed by the ellipse $\frac{x^2}{4} + \frac{y^2}{49} = 1$. Cross-sections perpendicular to the y-axis are semicircles.

A) $\frac{1792}{3} \approx 597.333$ B) $\frac{56\pi}{3} \approx 58.643$ C) 144 D) $144\pi \approx 452.389$

4) The base of a solid is the region enclosed by $y = 4$ and $y = \frac{x^2}{4}$. Cross-sections perpendicular to the y-axis are isosceles right triangles with the hypotenuse in the base.

A) $\frac{64}{3} \approx 21.333$ B) $\frac{250\sqrt{3}}{3} \approx 144.338$ C) $\frac{5488}{3} \approx 1829.333$ D) 32

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

A) $144\sqrt{3} \approx 249.415$ B) 72 C) $\frac{64\pi}{3} \approx 67.021$ D) $\frac{\pi}{4} \approx 0.785$

6) The base of a solid is the region enclosed by the ellipse $\frac{x^2}{49} + \frac{y^2}{16} = 1$. Cross-sections perpendicular to the y-axis are isosceles right triangles with one leg in the xy-plane.

A) $\frac{64\sqrt{3}}{3} \approx 36.95$ B) $\frac{4000}{3} \approx 1333.333$

C) $96\sqrt{3} \approx 166.277$ D) $\frac{1568}{3} \approx 522.667$

7) 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 y-axis are isosceles right triangles with one leg in the xy-plane.

A) $168\pi \approx 527.788$ B) 128 C) 36 D) 8

8) The base of a solid is the region enclosed by the ellipse $\frac{x^2}{9} + \frac{y^2}{25} = 1$. Cross-sections perpendicular to the y-axis are equilateral triangles.

A) 192 B) $\frac{1960}{3} \approx 653.333$

C) $60\sqrt{3} \approx 103.923$ D) $\frac{512}{3} \approx 170.667$

9) The base of a solid is the region enclosed by $y = 4$ and $y = \frac{x^2}{9}$. Cross-sections perpendicular to the y-axis are isosceles right triangles with one leg in the xy-plane.

A) $288\sqrt{3} \approx 498.831$ B) $\frac{343\pi}{3} \approx 359.189$ C) $\frac{128}{3} \approx 42.667$ D) 144

10) The base of a solid is the region enclosed by the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$. Cross-sections perpendicular to the y-axis are squares.

A) 1 B) 200 C) 576 D) $\frac{1600}{3} \approx 533.333$

11) The base of a solid is the region enclosed by the ellipse $\frac{x^2}{16} + \frac{y^2}{36} = 1$. Cross-sections perpendicular to the y-axis are equilateral triangles.

A) $200\sqrt{3} \approx 346.41$ B) $128\sqrt{3} \approx 221.703$

C) $\frac{9\pi}{4} \approx 7.069$ D) $\frac{512}{3} \approx 170.667$

12) 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 y-axis are semicircles.

A) $\frac{125\pi}{3} \approx 130.9$ B) 256 C) $\frac{1372}{3} \approx 457.333$ D) $\frac{64\pi}{3} \approx 67.021$

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