Calculus Practice: Using Definite Integrals to Calculate Volume 10a

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

1) The base of a solid is the region enclosed by $y = -x^2 + 4$ and $y = 0$. Cross-sections perpendicular to the x-axis are equilateral triangles.

A) 100 B) $\frac{128\sqrt{3}}{15} \approx 14.78$ C) $\frac{125}{3} \approx 41.667$ D) $\frac{686}{3} \approx 228.667$

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

A) $\frac{1372}{3} \approx 457.333$ B) $\frac{128\sqrt{3}}{15} \approx 14.78$

C) $\frac{256}{3} \approx 85.333$ D) $\frac{700\sqrt{3}}{3} \approx 404.145$

3) The base of a solid is the region enclosed by the circle $x^2 + y^2 = 36$. Cross-sections perpendicular to the x-axis are equilateral triangles.

A) 576 B) $\frac{128\sqrt{3}}{15} \approx 14.78$

C) $\frac{64\sqrt{3}}{3} \approx 36.95$ D) $288\sqrt{3} \approx 498.831$

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

A) $\frac{256}{15} \approx 17.067$ B) $\frac{400\sqrt{3}}{3} \approx 230.94$

C) $\frac{80\sqrt{3}}{3} \approx 46.188$ D) $\frac{1372}{3} \approx 457.333$

5) The base of a solid is the region enclosed by the ellipse $\frac{x^2}{49} + \frac{y^2}{36} = 1$. Cross-sections perpendicular to the x-axis are isosceles right triangles with the hypotenuse in the base.

A) $\frac{125}{3} \approx 41.667$ B) 336 C) 192 D) $\frac{8}{15} \approx 0.533$

6) The base of a solid is the region enclosed by the semicircle $y = \sqrt{25 - x^2}$ and the x-axis. Cross-sections perpendicular to the x-axis are isosceles right triangles with the hypotenuse in the base.

A) $\frac{128}{3} \approx 42.667$ B) $\frac{1000}{3} \approx 333.333$ C) $\frac{125}{3} \approx 41.667$ D) 784

7) The base of a solid is the region enclosed by the ellipse $\frac{x^2}{25} + \frac{y^2}{36} = 1$. Cross-sections perpendicular to the x-axis are equilateral triangles.

A) $\frac{8}{5} = 1.6$ B) $240\sqrt{3} \approx 415.692$ C) 672 D) $\frac{256\sqrt{3}}{3} \approx 147.802$

8) The base of a solid is the region enclosed by the semicircle $y = \sqrt{36 - x^2}$ and the x-axis. Cross-sections perpendicular to the x-axis are isosceles right triangles with the hypotenuse in the base.

A) 72 B) $\frac{128\sqrt{3}}{15} \approx 14.78$ C) 288 D) $\frac{8}{15} \approx 0.533$

9) The base of a solid is the region enclosed by the ellipse $\frac{x^2}{25} + \frac{y^2}{36} = 1$. Cross-sections perpendicular to the x-axis are isosceles right triangles with the hypotenuse in the base.

A) $392\sqrt{3} \approx 678.964$ B) $\frac{8}{15} \approx 0.533$ C) $\frac{4\sqrt{3}}{5} \approx 1.386$ D) 240

10) 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 isosceles right triangles with one leg in the xy-plane.

A) $\frac{980}{3} \approx 326.667$ B) 128 C) 168 D) $\frac{686}{3} \approx 228.667$

11) 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 isosceles right triangles with the hypotenuse in the base.

A) $\frac{256\sqrt{3}}{15} \approx 29.56$ B) $\frac{125\sqrt{3}}{3} \approx 72.169$ C) $\frac{64}{3} \approx 21.333$ D) $\frac{686}{3} \approx 228.667$

12) The base of a solid is the region enclosed by $y = 1$ and $y = \frac{x^2}{4}$. Cross-sections perpendicular to the x-axis are isosceles right triangles with one leg in the xy-plane.

A) $\frac{112}{3} \approx 37.333$ B) $\frac{16}{15} \approx 1.067$ C) $\frac{512}{15} \approx 34.133$ D) $\frac{125}{3} \approx 41.667$

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