Volume Assignment

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Volume Assignment

Question 0

Watch the lecture video here.

Did you watch the video? [Type yes or no.]

Question 1

When viewed from above, a swimming pool has the shape of a circle with radius 5 feet. If we put the circle in the x,y-plane centered at the origin, then cross sections of the pool perpendicular to the x-axis are squares. Find the volume of the pool.

[Hint: The cross section through the point on the circle (x, y) with $y > 0$ is a square with sides of length $2y$.]

[Answer: $\frac{2000}{3}$]

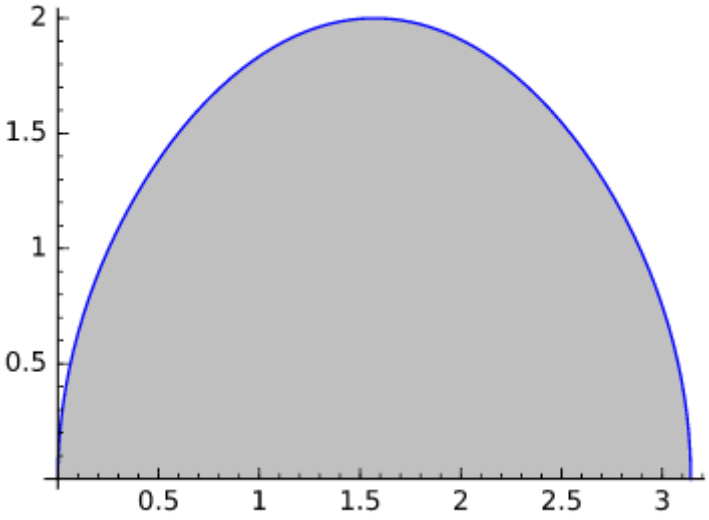
Question 2

Find the volume of the solid whose base is the region between the curve $y = 2\sqrt{\sin(x)}$ and the interval $[0, \pi]$ on the x-axis and whose cross sections perpendicular to the x-axis are equilateral triangles.

[Hint: The area of an equilaterial triangle with sides of length s is $A = \frac{\sqrt{3}}{4}s^2$].

[Answer: $2\sqrt{3}$]

Here is a picture of the base. Imagine a solid sticking out of the screen so that cutting perpendicular to the x-axis reveals an equilateral triangle.



Question 3

Find the volume of a right circular cone with height h and circular base of radius r.

[Hint: Put the top point of the cone at the origin, and lay the cone sideways so the x-axis goes through the center of the circular base. The cross section perpendicular to the x-axis at x is a circle with radius y, where (x, y) is on the line through $(0, 0)$ and (h, r).]

[Answer: $\frac{1}{3}\pi r^2 h$]