Example: Volumes Using Cross Sections

Pre-Class Quiz

Example: Volumes Using Cross Sections

Pre-Class Quiz

Question 1 1 pts

On Page 369, the textbook explains how the volume of a solid can be approximated by cylindrical solids.

In each sentence, **choose the correct option**.

- V is [the exact volume / an approximation of the volume] of the solid.
- Δx_k is the [base area / height / volume] of the k-th cylinder.
- $A(x_k)$ is the [base area / height / volume] of the k-th cylinder.
- $A(x_k)\Delta x_k$ is the [base area / height / volume] of the k-th cylinder.
- $\sum_{k=1}^{n} A(x_k)\Delta x_k$ is [the exact volume / an approximation of the volume] of the solid.

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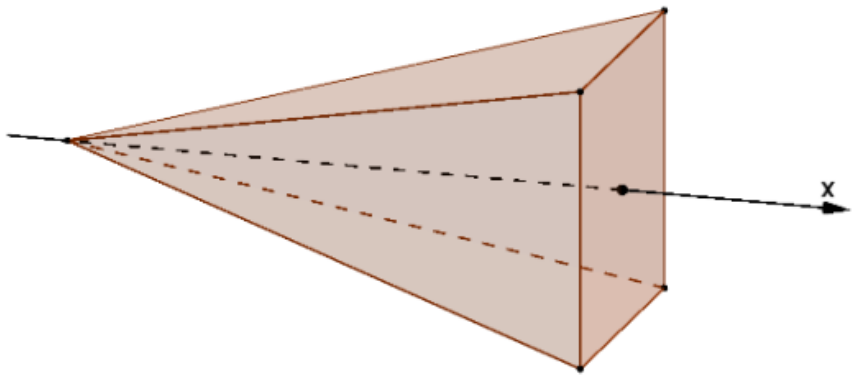
Question 2 1 pts

In the following diagram, a square-based pyramid was positioned, so that both its vertex and altitude lie on the x-axis.



What is **the shape of a typical cross section**, obtained by cutting the pyramid with a plane **perpendicular** to the x-axis?

- ○ A triangle.
- ○ A square.
- ○ A circle.
- ○ A line.
- ○ A trapezoid.

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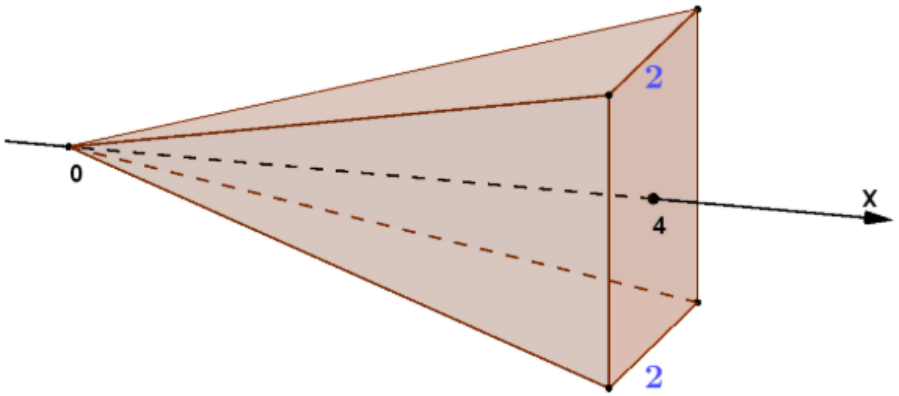
Question 3 1 pts

The following pyramid has height 4 and a square base of side length 2. It is positioned, so that its vertex is at the origin, and its altitude lies on the x-axis.



What is the function $A(x)$, representing **the area of a cross section** at x? (See Example 1 on pages 369-370.)

- $A(x) = \frac{x^2}{2}$
- $A(x) = \frac{x^2}{16}$
- $A(x) = \frac{x^2}{4}$
- $A(x) = 2x^2$
- $A(x) = 4x^2$

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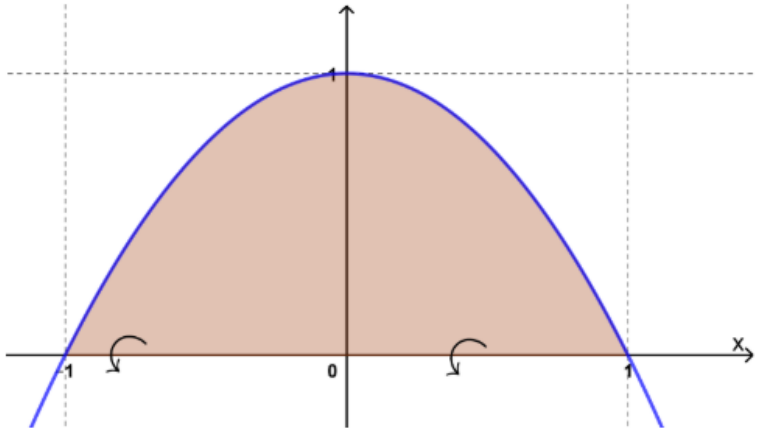
Question 4 1 pts

Find **the volume of the solid** obtained by revolving the region between the x-axis and the curve $y=1-x^2$ around the x-axis. **Round your answer to two decimal places.**



(Hints: Are the cross sections disks or washers? What is the area of a cross section at x?)

Example: Volumes Using Cross Sections

Pre-Class Quiz

Example: Volumes Using Cross Sections

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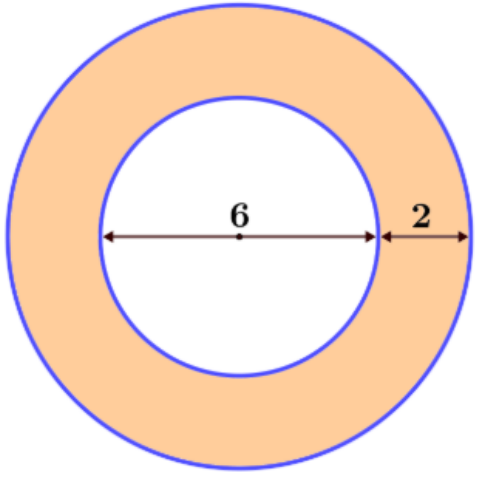
Question 5 1 pts

What is **the area of the following washer** (i.e., the shaded/orange region)?



- ○ 16π
- ○ 32π
- ○ 5π
- ○ 28π
- ○ 4π

Example: The Limit of a Function

Post-Class Quiz

Example: The Limit of a Function

Post-Class Quiz

Question 1 1 pts

The region between the curve $y = 6x - x^2$ and the x-axis is the base of a solid.

For each x-value, the cross section of the solid taken perpendicular to the x-axis is a **square** (with one side in the base).

Find the volume of the solid. Round your answer to two decimals.

Example: The Limit of a Function

Post-Class Quiz

Example: The Limit of a Function

Post-Class Quiz

Question 2 1 pts

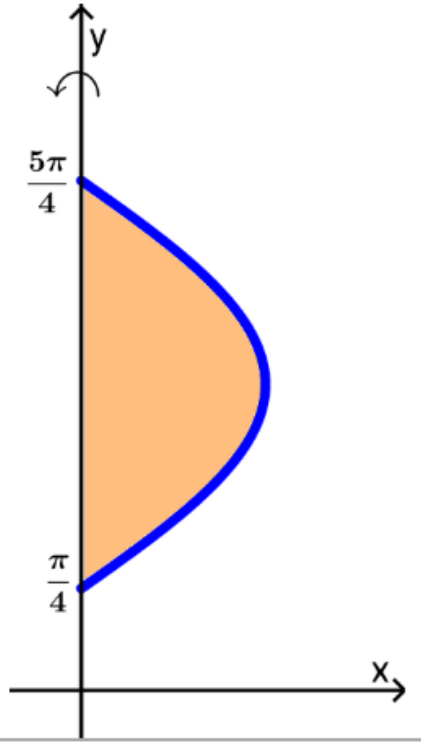
The region bounded by the curve

$x = \sin y - \cos y$, for $\frac{\pi}{4} \leq y \leq \frac{5\pi}{4}$,

revolves about the y-axis (see diagram).

Find the volume of the resulting solid.

Round your answer to two decimals.



Example: The Limit of a Function

Post-Class Quiz

Example: The Limit of a Function

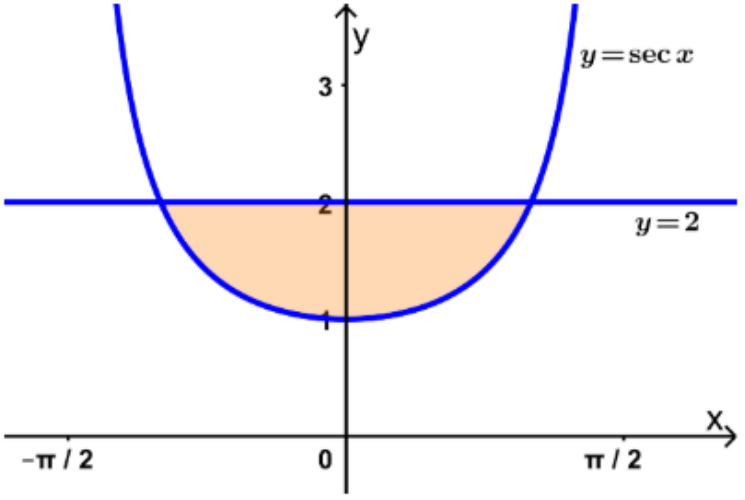
Post-Class Quiz

Question 3 1 pts

The region bounded by the curves $y = \sec x$ (for $-\frac{\pi}{2} < x < \frac{\pi}{2}$) and $y = 2$ rotates about the x-axis (see diagram).

Find the volume of the resulting solid.

Round your answer to two decimals.



Example: The Limit of a Function

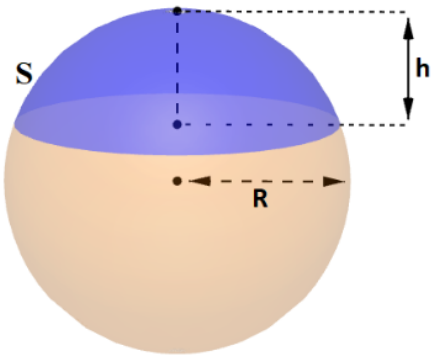
Post-Class Quiz

Example: The Limit of a Function

Post-Class Quiz

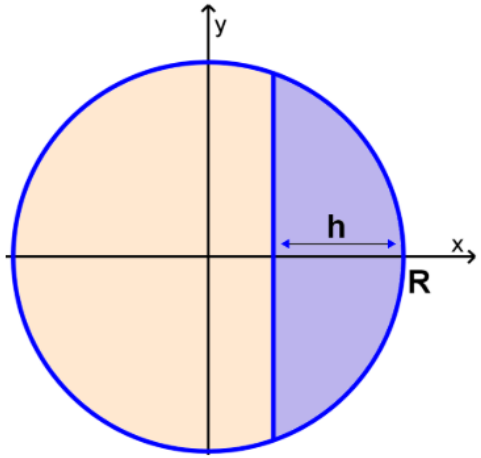
Question 4 1 pts

In the diagram, the purple solid S is a portion of a sphere cut off by a plane.



Find a formula for **the volume** of S in terms of R and h. **Show and explain your work.**

The following diagram will help you set up the integral.



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Example: The Limit of a Function

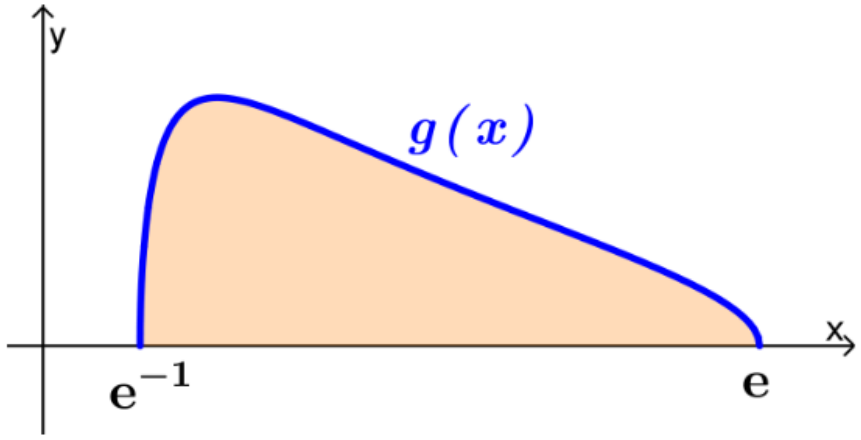
Post-Class Quiz

Example: The Limit of a Function

Post-Class Quiz

Question 5 1 pts

Find the **volume of a solid**, whose base is the region bounded by the graph of $g(x)=\sqrt{\frac{1-(\ln x)^2}{x}}$ and the x-axis (see diagram), and its cross sections, perpendicular to the x-axis, are **equilateral triangles** (with one side in the base).



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