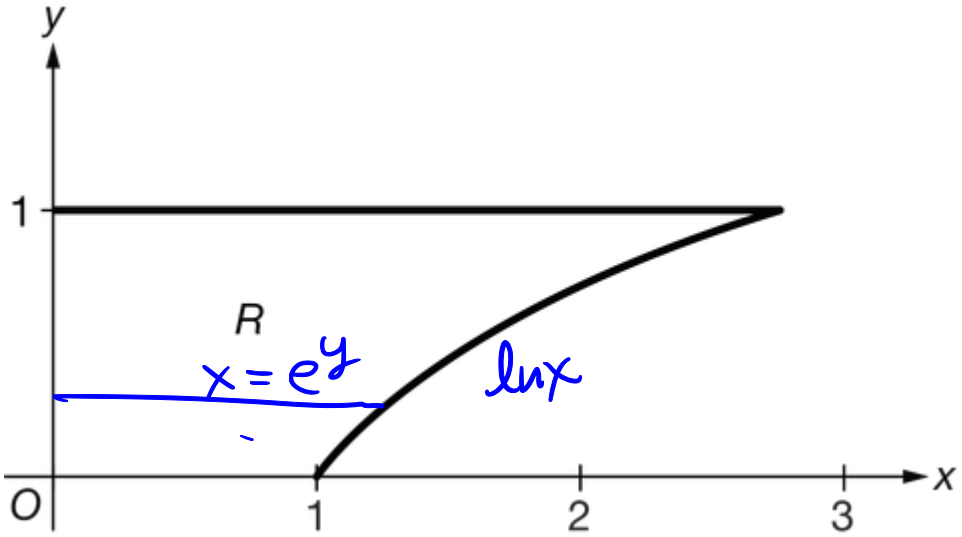
Wrap Up Volume 1

Name

1.



Let R be the region in the first quadrant bounded by the x- and y-axes, the horizontal line $y = 1$, and the graph of $y = \ln x$, as shown in the figure above. What is the volume of the solid generated when region R is revolved about the y-axis?

$\int_0^1 \pi (e^y)^2 dy = \int_0^1 \pi e^{2y}$

$= \frac{\pi}{2} e^{2y} \Big|_0^1$

(A) $\pi(e-1)$

(B) $\frac{\pi(e^2-1)}{2}$

(C) $\pi(e^2-1)$

(D) $2\pi(e^2-1)$

2. Let R be the triangular region in the first quadrant with vertices at points $(0,0)$, $(h,0)$, and (h,r), where r and h are positive constants. Which of the following gives the volume of the solid generated when region R is revolved about the x-axis?

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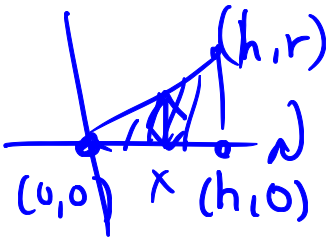
(A) $\pi \int_0^r \left(\frac{h}{r}x\right)^2 dx$

(B) $\pi \int_0^h \left(\frac{h}{r}x\right)^2 dx$

(C) $\pi \int_0^r \left(\frac{r}{h}x\right)^2 dx$

(D) $\pi \int_0^h \left(\frac{r}{h}x\right)^2 dx$



$y = \frac{r}{h}x$

3. The base of a solid is the region bounded by the x-axis and the graph of . For the solid, each cross section perpendicular to the x-axis is a square. What is the volume of the solid?

(A)

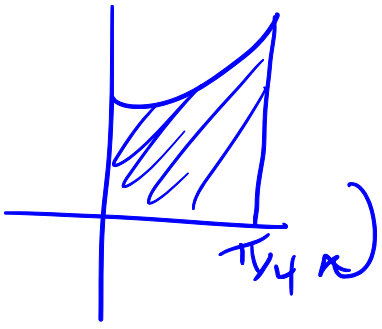
(B)

(C) 2

(D)

(E)

4. The region in the first quadrant bounded by the graph of $y = \sec x, x = \frac{\pi}{4}$, and the axes is rotated about the x-axis. What is the volume of the solid generated?



$$V = \int_0^{\frac{\pi}{4}} \pi \sec^2 x \, dx$$

$$= \pi \tan x \Big|_0^{\pi/4} = \pi$$

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A $\frac{\pi^2}{4}$

B $\pi - 1$

C π

D 2π

E $\frac{8\pi}{3}$