Verify using integration that the volume of a sphere of radius \( r \) is \( \frac{4}{3} \pi r^3 \).
Find the volume of the solid below with square base and top and height $h$. 

![Diagram of a solid with square base and top]
Set Up an integral for the volume of the solid:

(a) Under $y = \sin(x)$ between $x = \pi$ and $x = 2\pi$, rotated about $y = 1$.

(b) Between $y = \cos(x)$ and $y = \sin(x)$ between $x = \frac{\pi}{4}$ and $x = \pi$, rotated about the y-axis.
Find the volume of the described solids:

a. \( y = \ln(x), \ y = 1, \ y = 2, \ x = 0 \) about the \( y \)-axis.

b. \( y = x^2 \) and \( x = y^2 \) about the \( x \)-axis.
Rotate the region between \( y = x - x^2 \) and \( y = -x \) about the y-axis and find the volume.
Set up an integral for the volume:

a. \( y = x, \quad y = 4x - x^2 \quad \text{about} \quad x = 7 \)

b. \( x = \sqrt{\sin(y)} \quad 0 \leq y \leq \pi, \quad x = 0 \quad \text{about} \quad y = 4 \)