Practice Assessment 5
Determining Volumes

These **practice problems** are designed to help you **prepare for our course exams** and **assess your understanding** of the course material at the expected level. Aim to complete them **in class, during tutoring, office hours, or on your own**, and try to solve them **without notes or a calculator**, just like on the **actual exams**. Remember, **practice makes perfect**, so don't hesitate to **ask for help** if you get stuck.

1. Draw an outline of the solid and find the volume using the slicing method.

   (a) The base is the region under the parabola $y = 1 - x^2$ in the first quadrant. Slices perpendicular to the xy-plane and parallel to the y-axis are squares.

   (b) The base is the area between $y = x$ and $y = x^2$. Slices perpendicular to the x-axis are semicircles.

2. Draw the region bounded by the curves $y = e^x + 1$, $x = 0$, $x = 1$, and $y = 0$. Use the disk method to find the volume when the region is rotated around the x-axis.

3. Draw the region bounded by the curves $y = \sqrt{4 - x^2}$, $x = 0$, and $y = 0$. Find the volume when the region is rotated around the y-axis.

4. Draw the region bounded by the curves $y = \sqrt{x}$, $x = 4$, and $y = 0$. Use the washer method to find the volume when the region is rotated around the y-axis.

5. Draw the region bounded by the curves $x = \sqrt{9 - y^2}$, $x = e^{-y}$, $y = 0$ and $y = 3$. Use the washer method to find the volume when the region is rotated around the y-axis.