Application to geometry: **Section 8.2**

1. Consider the region bounded by the curve $y = e^x$, the x-axis, and the lines $x = -1$ and $x = 1$. Find the volume of the following solids. Include sketches.

A. The solid obtained by rotating the region about the x-axis.

B. The solid obtained by rotating the region about the horizontal line $y = -5$.

2. Draw a sketch of the region in the xy-plane bounded by the curves $y = x^2$ and $y = 5 - x^2$. Find the volume of the solid whose base is the region and whose cross sections perpendicular to x-axis are squares with one side in the xy- plane.

3. Find the volume of the solid whose base is the region in the xy-plane bounded by the first arch of $y = \sin x$ and $y = -\sin x$ and whose cross sections perpendicular to x –axis are squares with one side in the xy-plane.

4. Find the exact volume of the solid obtained by revolving the region between the graph of $y = 1 - x^2$ and the x-axis about the line $y = 5$. Give the sketch of the region in the xy-plane and also the picture of the solid.

5. The region bounded by $y = x^3, x = 2$, and $y = -1$ is revolved about the line $y = -8$. Sketch the picture of the region and the solid. Find the volume.

6. Sketch a picture of the solid obtained by revolving the region bounded by the curve $y = x^4$ and the line $y = x$ about the y-axis. Also find the volume of the solid.

7. Consider the region bounded by the curve $y = \sqrt[3]{x}$, the x-axis, and the lines $x = 0$, and $x = 8$. Find the volume of the following solids:

a. The solid obtained by rotating this region about the x-axis.

b. The solid obtained by rotating this region about the horizontal line $y = -2$.

c. The solid obtained by rotating this region about the vertical line $x = 8$.

d. The solid obtained by rotating this region about the y-axis