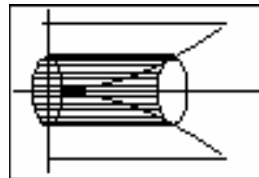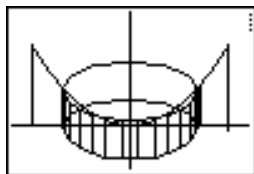# LESSON 3: VOLUMES
SHELL METHOD

Objective:	To use the shell method for finding the volume of solids of revolution

Vertical Axis of Revolution   *Horizontal Axis of Revolution*

$$\text{Volume} = V = 2\pi \int_a^b rh\,dx \qquad V = 2\pi \int_{f(a)}^{f(b)} rh\,dy$$

r = average radius
h = height (top-bottom or right-left)

Shell Method Preferable

1. Find the volume of the solid of revolution of the region bounded by $y^2 = 2x - 2$ and the line $y = x - 5$ revolved about the line $y = -2$.

Shell Method Necessary

2. Find the volume of the solid formed by revolving the region bounded by the graphs of $y = x^3 + x + 1$, $y = 1$, and $x = 1$ about the line $x = 2$.

Practice

1. A hole of radius 2 inches is drilled through a spherical shaped solid of radius 8 inches. The axis of the hole is a diameter of the sphere. Find the volume of the part of the solid that remains.