Area and Volume: Study Guide   Name _____

A. Area Between Two Curves

1. Find the area of the region bounded by $y = \sqrt{x}$, $y = 4$, and $y = -\frac{1}{4}x$.

2. (No Calculator) Find the area of the region bounded by $y = 2 - x^2$ and $y = x$.

3. Find the area of the region bounded by $x = \frac{1}{2}y^2$, $y = 1$, and $y = -\frac{1}{2}x + 3$.

4. Find the area of the region bounded by $y = -\frac{x^3}{2} + 2x^2$, and $y = -x^2 + 4x$.

B. Disk/Washer Method

1. Find the volume of the solid that results when the region bounded by $y = 5 - x^2$, the y-axis, and the line y = 1 is revolved about:

     a.   The y-axis (No Calculator)   b.   The line x = 3

2. Find the volume of the solid that results when the region enclosed by the curves $y = \sqrt{x} + 1$, and $y = x^2 + 1$ is revolved about the line y = -1.

3. Find the volume of the solid that results when the region enclosed by the curves $x = -y^2 + 2$ and x = y is revolved about the line x = -2.

C. Shell Method

1. Find the volume of the solid that results when the region enclosed by the curves $y = \sqrt{x} + 4$ and $y = x^2 + 4$ is revolved about the x-axis.

2. Find the volume of the solid that results when the region enclosed by the curves $y = \sqrt{x}$ and $y = 7$, x = 0, and x = 4 is revolved about the x-axis.

3. Find the volume of the solid that results when the region enclosed by the curves $y = -x^2 + 7$ and $y = x^2 + 5$ is revolved about the line x = 2.

D. Volumes with Known Cross Sections

1. The base of a solid is the region enclosed by the semicircle $y = \sqrt{25 - x^2}$ and the x-axis. Cross sections perpendicular to the x-axis are squares. Find the volume of the solid.

2. The base of a solid is the region enclosed by the semicircle $y = -\frac{x^2}{9} + 4$ and the x-axis. Cross sections perpendicular to the x-axis are semicircles. Find the volume of the solid.

E. Volume Miscellaneous

1. The region bounded by $y = \cos x$, the x-axis and the y-axis is revolved about the given axis. Find the volume of each resulting solid.

     a.   Axis of revolution: x-axis
     b.   Axis of revolution: y-axis
     c.   Axis of revolution: x = 3
     d.   Axis of revolution: y = -2