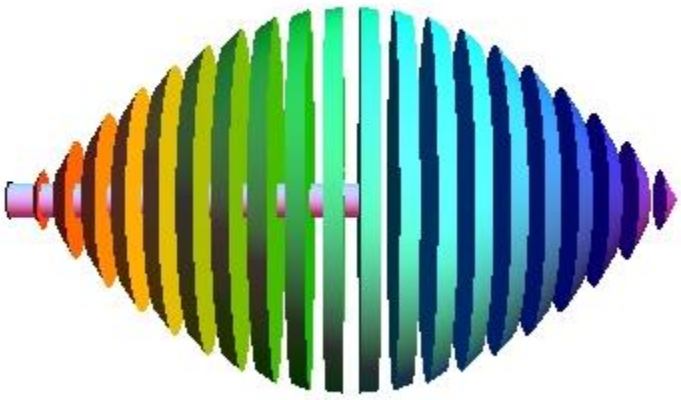
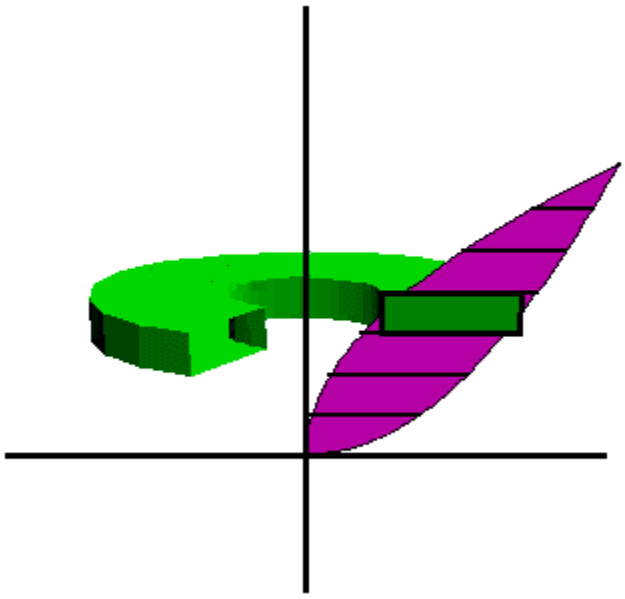
WORKSHEET III

DISKS AND WASHERS VS SHELLS





1. Find the volume of the solid of revolution obtained by rotating the region bounded by $y = x^2$, $y = 0$, $x = 2$ about the y-axis.

2. Find the volume of the solid of revolution obtained by rotating the region bounded by $y = \sec x$, $y = 0$, $x = -\pi/4$, $x = \pi/4$, about the x-axis.
3. Find the volume of the solid of revolution obtained by rotating the region bounded by $y = x$, $y = 1$, $x = 0$, about the x-axis.
4. Find the volume of the solid of revolution obtained by rotating the region bounded by $4 - x^2$, $y = 2 - x$, about the x-axis.
5. Find the volume of the solid of revolution obtained by rotating the region enclosed by the triangle with vertices (1, 0), (2, 1), and (1, 1), about the y-axis.
6. Find the volume of the solid of revolution obtained by rotating the region in the first quadrant bounded above by $y = x^2$, below by the x-axis, and on the right by the line $x = 1$, about the line $x = -1$.
7. Find the volume of the solid of revolution obtained by rotating the region in the second quadrant bounded above by the curve $y = -x^3$, below by the x-axis, and on the left by the line $x = -1$, about the line $x = -2$.

SHELLS

1. Find the volume of the solid obtained by rotating about the the y-axis the region bounded by $y = 2x^2 - x^3$ and $y = 0$.
2. Find the volume of the solid obtained by rotating about the y-axis the region between $y = x$ and $y = x^2$.
3. Use shells to find the volume of the solid obtained by rotating about the x-axis the region under the curve $y = x^{1/2}$ from 0 to 1.
4. Find the volume of the solid obtained by rotating the region bounded by $y = x - x^2$ and $y = 0$ about the line $x = 2$.
5. Find the volume of the solid obtained by rotating the region bounded $x = 1 + (y - 2)^2$ and $x = 2$ about the x-axis.
6. Find the volume of the solid obtained by rotating the region bounded by $y = 4x - x^2$ and $y = 3$ about the axis $x = 1$.
7. Each of following integrals represents the volume of a solid. Describe the solid:

   (a) $\int_0^3 2\pi x^5 dx$

(b) $\int_0^1 2\pi(3-y)(1-y^2)dy$

(c) $2\pi\int_0^2 \frac{y}{1+y^2}dy$