

Math 31 – Workshop #6

1. The region bounded by the graphs of $y = (1 - x^2)^{\frac{1}{2}}$ and $y = 1 - x$ is rotated about the y -axis. Find the volume of this region by the shell method.
2. The region bounded by the graphs of $f(x) = x^{\frac{1}{2}}$ and $g(x) = x^3$ is rotated about the y -axis. Find the volume of this region using the shell method.
3. The region bounded by the graphs of $y = x^2$, $y = x - 1$, $y = 0$, and $y = 2$ is rotated about the x -axis. Find the volume of this region using the shell method.
4. The region bounded by the graphs of $y = e^x$, $y = 1$, and $x = 1$ is rotated about the x -axis.
 - (a) Set up the integrals to find the volume of this region by both the disk method and by the shell method.
 - (b) Compute one of these integrals.
5. The region bounded by the graphs of $y = 2 \sin\left(\frac{\pi x}{2}\right)$ and $y = x$, between $x = 0$ and $x = 1$ is rotated about the y -axis. Set up an integral to compute the volume.
6. The following integral represents the volume of a solid that is obtained by rotating a region in the $x - y$ plane about one of the coordinate axes.

$$V = \pi \int_0^2 x^4 dx$$

- (a) If this was a region that was rotated about the x -axis, then what was the region?
- (b) If this was a region that was rotated about the y -axis, then what was the region?