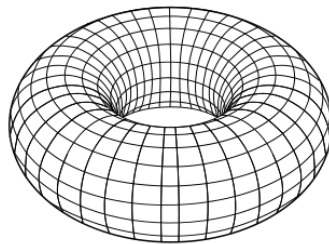


Homework Set 22: Volumes of solids using Cylindrical Shells

1. Use cylindrical shells to find the volume of the solid that results when the region bounded by the x -axis, $y = x^3$ and $x = 1$ is rotated about the y -axis.
2. Use cylindrical shells to find the volume of the solid that results when the region bounded by $y = \cos(x^2)$, $x = 0$, $x = \frac{1}{2}\sqrt{\pi}$ and $y = 0$ is rotated about the y -axis.
3. Use cylindrical shells to find the volume of the solid that results when the region bounded by the y -axis, $y = x$ and $y = \sqrt{4 - x^2}$ is rotated about the y -axis.
4. Use cylindrical shells to find the volume of the solid generated when the region enclosed by $x = 2y$, $y = 2$, $y = 3$ and $x = 0$ is revolved about the y -axis.
5. Use cylindrical shells to find the volume of the solid that results when the region bounded by the y -axis and $x = 2y - 2y^2$ is rotated about the x -axis.
6. Use cylindrical shells to find the volume of the solid that results when the region bounded by $x = y$, $y = \sqrt{x + 2}$ and $y = 0$ is rotated about the x -axis.
7. Use cylindrical shells to find the volume of the solid generated when the region enclosed by $xy = 4$ and $x + y = 5$ is revolved about the x -axis.
8. Use cylindrical shells to find a formula for the volume of a torus.



9. A cylindrical hole is drilled through the centre of a sphere. Show that the volume of the remaining solid depends only on the length of the hole, L , and not on the size (radius) of the sphere.

