Section 6.2:

1–18 Find the volume of the solid obtained by rotating the region bounded by the given curves about the specified line. Sketch the region, the solid, and a typical disk or washer.

3. $y = 1/x,\ x = 1,\ x = 2,\ y = 0;$ about the x-axis

7. $y = x^3,\ y = x,\ x \geqslant 0;$ about the x-axis

13. $y = 1 + \sec x,\ y = 3;$ about $y = 1$

17. $y = x^2,\ x = y^2;$ about $x = -1$

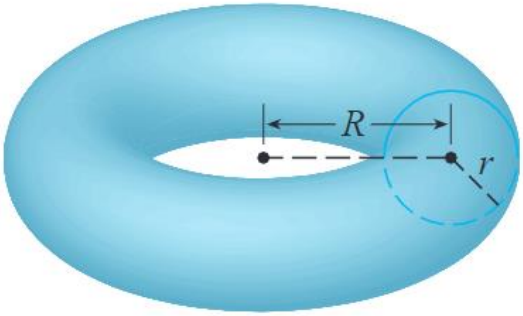
41–44 Each integral represents the volume of a solid. Describe the solid.

41. $\pi \int_0^{\pi/2} \cos^2 x\, dx$

57. The base of S is an elliptical region with boundary curve $9x^2 + 4y^2 = 36$. Cross-sections perpendicular to the x-axis are isosceles right triangles with hypotenuse in the base.

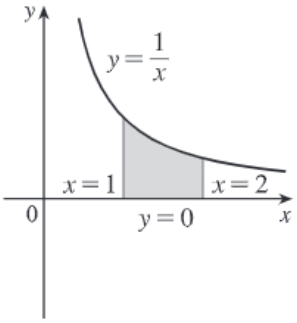
61. The base of S is the region enclosed by the parabola $y = 1 - x^2$ and the x-axis. Cross-sections perpendicular to the x-axis are isosceles triangles with height equal to the base.

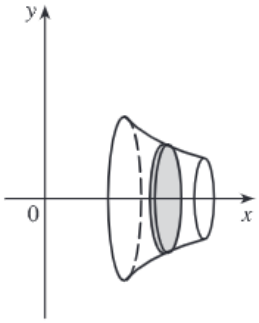
63. (a) Set up an integral for the volume of a solid *torus* (the donut-shaped solid shown in the figure) with radii r and R.
(b) By interpreting the integral as an area, find the volume of the torus.



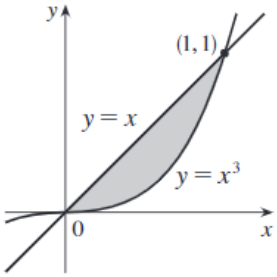
Answers for sec 6.2

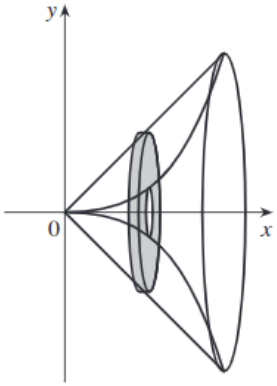
3. $\pi/2$



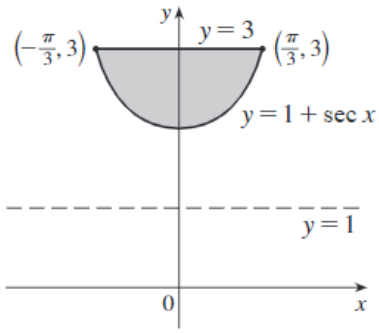


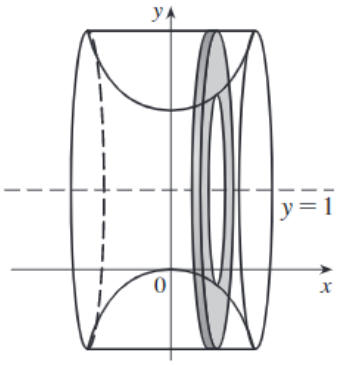
7. $4\pi/21$



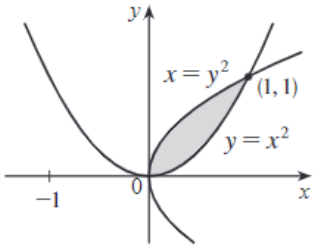


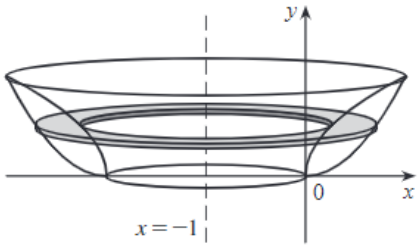
13. $2\pi\left(\frac{4}{3}\pi - \sqrt{3}\right)$





17. $29\pi/30$





41. Solid obtained by rotating the region $0 \leqslant y \leqslant \cos x$, $0 \leqslant x \leqslant \pi/2$ about the x-axis

57. 24

61. $\frac{8}{15}$

63. (a) $8\pi R \int_0^r \sqrt{r^2 - y^2}\, dy$