Section 7.3 (page 474)

1. $2\pi\int_0^2 x^2\,dx = \frac{16\pi}{3}$

3. $2\pi\int_0^4 x\sqrt{x}\,dx = \frac{128\pi}{5}$

5. $2\pi\int_0^3 x^3\,dx = \frac{81}{2}\pi$

7. $2\pi\int_0^2 x(4x - 2x^2)\,dx = \frac{16\pi}{3}$

9. $2\pi\int_0^2 x(x^2 - 4x + 4)\,dx = \frac{8\pi}{3}$

11. $2\pi\int_2^4 x\sqrt{x-2}\,dx = \frac{128\pi}{15}\sqrt{2}$

13. $2\pi\int_0^1 x\left(\frac{1}{\sqrt{2\pi}}e^{-x^2/2}\right)dx = \sqrt{2\pi}\left(1 - \frac{1}{\sqrt{e}}\right) \approx 0.986$

15. $2\pi\int_0^2 y(2 - y)\,dy = \frac{8\pi}{3}$

17. $2\pi\left[\int_0^{1/2} y\,dy + \int_{1/2}^1 y\left(\frac{1}{y} - 1\right)dy\right] = \frac{\pi}{2}$

19. $2\pi\left[\int_0^8 y^{4/3}\,dy\right] = \frac{768\pi}{7}$

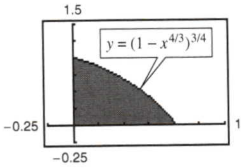
21. $2\pi\int_0^2 y(4 - 2y)\,dy = 16\pi/3$ **23.** 64π **25.** 16π

27. Shell method; it is much easier to put x in terms of y rather than vice versa.

29. (a) $128\pi/7$ (b) $64\pi/5$ (c) $96\pi/5$

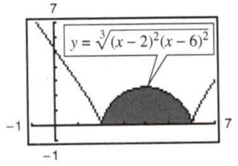
31. (a) $\pi a^3/15$ (b) $\pi a^3/15$ (c) $4\pi a^3/15$

33. (a)



(b) 1.506

35. (a)



(b) 187.25

37. d **39.** a, c, b

41. Both integrals yield the volume of the solid generated by revolving the region bounded by the graphs of $y = \sqrt{x-1}$, $y = 0$, and $x = 5$ about the x-axis.

43. (a) The rectangles would be vertical.
 (b) The rectangles would be horizontal.

45. Diameter $= 2\sqrt{4 - 2\sqrt{3}} \approx 1.464$ **47.** $4\pi^2$

49. (a) Region bounded by $y = x^2$, $y = 0$, $x = 0$, $x = 2$
 (b) Revolved about the y-axis

51. (a) Region bounded by $x = \sqrt{6 - y}$, $y = 0$, $x = 0$
 (b) Revolved about $y = -2$

53. (a) Proof (b) (i) $V = 2\pi$ (ii) $V = 6\pi^2$

55. Proof

57. (a) $R_1(n) = n/(n+1)$ (b) $\lim_{n\to\infty} R_1(n) = 1$
 (c) $V = \pi ab^{n+2}[n/(n+2)]$; $R_2(n) = n/(n+2)$
 (d) $\lim_{n\to\infty} R_2(n) = 1$
 (e) As $n \to \infty$, the graph approaches the line $x = b$.

59. (a) and (b) About 121,475 ft^3 **61.** $c = 2$

63. (a) $64\pi/3$ (b) $2048\pi/35$ (c) $8192\pi/105$