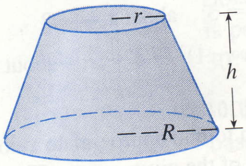
listed in the table. Use the Midpoint Rule with $n = 5$ to estimate the volume of the log.

x (m)	A (m^2)	x (m)	A (m^2)
0	0.68	6	0.53
1	0.65	7	0.55
2	0.64	8	0.52
3	0.61	9	0.50
4	0.58	10	0.48
5	0.59		

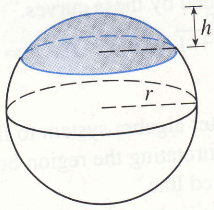
47–59 ||| Find the volume of the described solid S.

47. A right circular cone with height h and base radius r

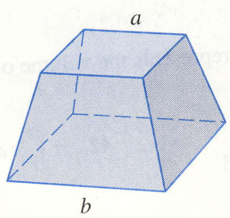
48. A frustum of a right circular cone with height h, lower base radius R, and top radius r



49. A cap of a sphere with radius r and height h



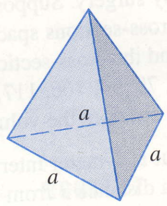
50. A frustum of a pyramid with square base of side b, square top of side a, and height h



What happens if $a = b$? What happens if $a = 0$?

51. A pyramid with height h and rectangular base with dimensions b and $2b$

52. A pyramid with height h and base an equilateral triangle with side a (a tetrahedron)



53. A tetrahedron with three mutually perpendicular faces and three mutually perpendicular edges with lengths 3 cm, 4 cm, and 5 cm

54. The base of S is a circular disk with radius r. Parallel cross-sections perpendicular to the base are squares.

55. 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.

56. The base of S is the parabolic region $\{(x, y) \mid x^2 \leq y \leq 1\}$. Cross-sections perpendicular to the y-axis are equilateral triangles.

57. S has the same base as in Exercise 56, but cross-sections perpendicular to the y-axis are squares.

58. The base of S is the triangular region with vertices $(0, 0)$, $(3, 0)$, and $(0, 2)$. Cross-sections perpendicular to the y-axis are semicircles.

59. S has the same base as in Exercise 58, but cross-sections perpendicular to the y-axis are isosceles triangles with height equal to the base.

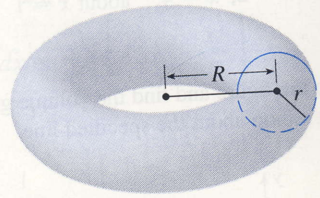
60. The base of S is a circular disk with radius r. Parallel cross-sections perpendicular to the base are isosceles triangles with height h and unequal side in the base.

(a) Set up an integral for the volume of S.

(b) By interpreting the integral as an area, find the volume of S.

61. (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.



62. Solve Example 9 taking cross-sections to be parallel to the line of intersection of the two planes.

63. (a) Cavalieri's Principle states that if a family of parallel planes gives equal cross-sectional areas for two solids S_1 and S_2, then the volumes of S_1 and S_2 are equal. Prove this principle.

(b) Use Cavalieri's Principle to find the volume of the oblique cylinder shown in the figure.