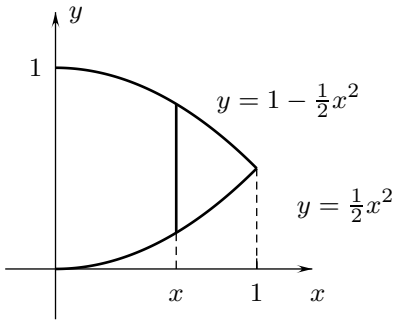
(9/30/08)

Math 10B. Lecture Examples.

Section 8.1. Areas and volumes[†]

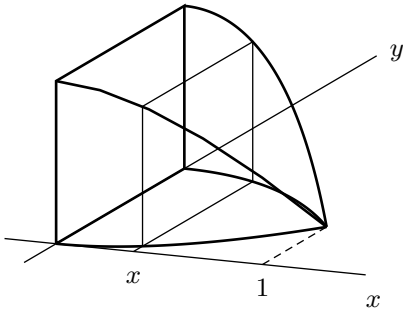
Example 1 **The base of a solid is the region between the curves $\mathbf{y = \frac{1}{2}x^2}$ and $\mathbf{y = 1 - \frac{1}{2}x^2}$ for $\mathbf{0 \le x \le 1}$ in an xy-plane and its cross sections perpendicular to the x-axis are squares. Find its volume.**

Answer: Figures A1a and A1b • [Volume] = $\frac{8}{15}$



Base of the solid

Figure A1a

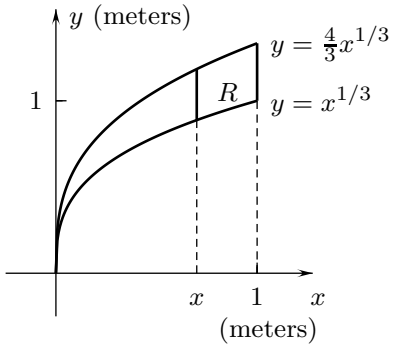


The solid

Figure A1b

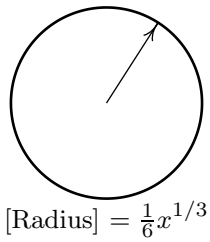
Example 2 **The intersection of a solid with an xy-plane with distances measured in meters is the region R between the curves $\mathbf{y = x^{1/3}}$ and $\mathbf{y = \frac{4}{3}x^{1/3}}$ for $\mathbf{0 \le x \le 1}$. The cross sections of the solid perpendicular to the x-axis are circles with diameters in the xy-plane. Find its volume.**

Answer: Figures A2a and A2b. • [Volume] = $\frac{1}{60}\pi$ cubic meters



The region

Figure A2a



The cross section at x

Figure A2b

Interactive Examples

Work the following Interactive Examples on Shenk's web page, http//www.math.ucsd.edu/~ashenk/:[‡]

Section 7.3: Examples 1 and 2

[†]Lecture notes to accompany Section 8.1 of *Calculus* by Hughes-Hallett et al

[‡]The chapter and section numbers on Shenk's web site refer to his calculus manuscript and not to the chapters and sections of the textbook for the course.