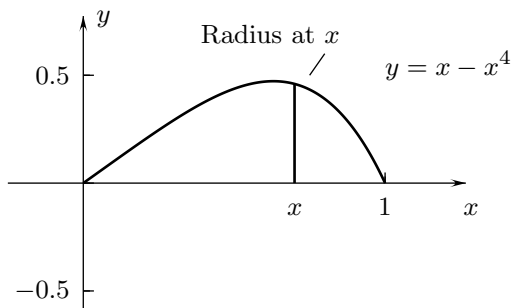


Math 10B. Lecture Examples.

Section 8.2. Applications to geometry[†]

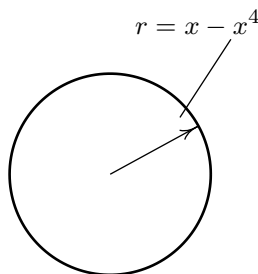
Example 1 The region bounded by the curve $y = x - x^4$ and the x -axis is rotated about the x -axis. Find the volume of the solid that is generated.

Answer: Figures A1a and Figure A1b • [Volume] = $\frac{1}{9}\pi$



The region that is rotated

Figure A1a

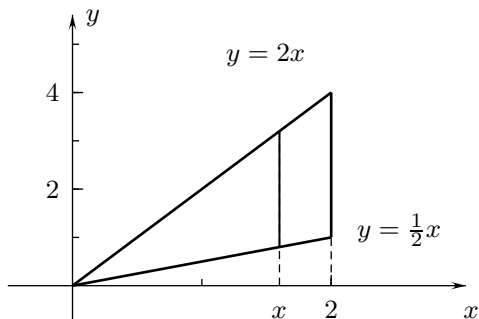


The cross section at x

Figure A1b

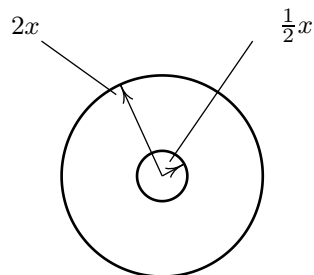
Example 2 Find the volume of the solid that is generated when the triangle between the lines $y = \frac{1}{2}x$ and $y = 2x$ for $0 \leq x \leq 2$ is rotated about the x -axis.

Answer: Figures A2a and A2b • [Volume] = 10π .



The triangle that is rotated

Figure A2a



The cross section at x

Figure A2b

[†]Lecture notes to accompany Section 8.2 of *Calculus* by Hughes-Hallett et al

Example 3 Find the length of $y = \frac{2}{3}x^{3/2}$ for $0 \leq x \leq 1$.

Answer: [Length] = $\frac{2}{3}(2^{3/2} - 1)$

Example 4 Express the length of $y = e^x$ for $-1 \leq x \leq 1$ as a definite integral.

Answer: [Length] = $\int_{-1}^1 \sqrt{1 + (e^x)^2} dx$

Interactive Examples

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

Section 7.2: Examples 1–4

Section 7.5: Example 1

[‡]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.