Math 20B. Lecture Examples.

Section 6.1. Area between two curves†

Example 1  Find the area of the region bounded by \( y = x^2 \) and \( y = 2x \).

Answer: Figure A1  \( \int_{1}^{2} (2x - x^2) \, dx = \frac{4}{3} \)

Example 2  What is the area of the region bounded by the curves \( y = x^2 \) and \( y = -x^2 \) and by the vertical line \( x = 2 \)?

Answer: Figure A2  \( \int_{-2}^{2} (2 - x^2) \, dx = \frac{16}{3} \)

†Lecture notes to accompany Section 6.1 of Calculus, Early Transcendentals by Rogawski
Example 3  Find the area of the region bounded by \( y = \frac{3}{x} \) and \( y = 4 - x \).

Answer: Figure A3  \[ \text{Area} = 4 - 3 \ln(3) \]

Example 4  What is the area of the region bounded by \( y = e^x \) and the lines \( x = -1 \) and \( y = 5 \)?

Answer: Figure A4  \[ \text{Area} = 5 \ln(5) + e^{-1} \]

Example 5  Find the area of the region bounded the curves \( x = -\frac{1}{5}y^4 \) and \( x = y \).

Answer: Figure A5  \[ \text{Area} = \frac{6}{5} \]

Interactive Examples

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

Section 7.1: Examples 1–5

\textsuperscript{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.