Math 10B. Lecture Examples.

Section 6.4. Second Fundamental Theorem of Calculus†

Example 1
Find the derivative \( \frac{d}{dx} \int_1^x \sqrt{t^4 + 7} \, dt \).

Answer: \( \frac{d}{dx} \int_1^x \sqrt{t^4 + 7} \, dt = \sqrt{x^4 + 7} \)

Example 2
What is the derivative of \( G(x) = \int_x^4 \sin^4 t \, dt \) at \( x = \frac{1}{2} \pi \)?

Answer: \( G' \left( \frac{1}{2} \pi \right) = -1 \)

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

Section 6.4: Examples 1 and 2

†Lecture notes to accompany Section 6.4 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.