Integrated Calculus II, Spring 2004
Homework Assignments
Homework 1, due Tuesday January 13th

- Read Chapter 5, Sections 5.1 to 5.4.

- Do the following book problems, to be handed in during your recitation:
  - Section 5.1: questions 10, 34.
  - Section 5.2: questions 8, 12, 20.
    For question 8, explain graphically why your estimate is actually the exact answer for the integral.
    Note that for question 8, the problem asks for the Midpoint Riemann Sum.
  - Section 5.3: questions 2, 4, 6, 8, 10, 12.
Homework 2, due Tuesday January 20th

- Read Chapter 5, Sections 5.1 to 5.7.
- Prepare for quiz one this Friday: Riemann Sums, Integration, The Fundamental Theorem of Calculus and Substitution.
- Do the following book problems, to be handed in during your recitation:
  - Section 5.4: questions 8, 18.
  - Section 5.5: questions 16, 20, 24, 32, 36, 42, 48, 58.

When making your substitutions, make sure you include all steps.
The model you should use is as follows:

\[
\int_{0}^{2} x^2(1 - x^3)^9 dx.
\]

- Function substitution: \( u = 1 - x^3 \).
- Differential substitution: \( du = \frac{du}{dx} dx = -3x^2 dx \).
- Then the integrand is \( x^2(1 - x^3)^9 dx = -\frac{1}{3} u^9 du \).
- The \( u \)-range is from \( u = 1 - 0^3 = 1 \), when \( x = 0 \), to \( u = 1 - 2^3 = -7 \), when \( x = 2 \).
- So the integral becomes:

\[
\int_{0}^{2} x^2(1 - x^3)^9 dx = -\frac{1}{3} \int_{1}^{-7} u^9 du
\]

\[
= -\frac{1}{30}[u^{10}]_{-7}^{-1} = -\frac{1}{30}((-7)^{10} - 1) = -\frac{47079208}{5}.
\]

Homework 3, due Tuesday January 27th

- Read to the end of Chapter 5.
- Review the solutions to quiz one.
- Do the following book problems, to be handed in during your recitation:
  - Section 5.7: questions 4, 6, 8, 10, 18, 24.
  - Section 5.8: questions 20, 22, 44, 48.
Homework 4, due Tuesday February 3rd

- Read to the end of Chapter 5.
- Prepare for the quiz this Friday: partial fractions, trigonometric substitutions and (separable) differential equations.
- Prepare for exam 1, next Friday.
- Do the following book problems, to be handed in during your recitation:
  - Section 5.9: questions 12, 14, 20, 24, 26.
  - Draw the slope field for the differential equation:
    \[ \frac{dy}{dt} = y(4 - y). \]
    Based on your sketch, discuss the behavior of the solutions of this differential equation as \( t \) varies.
  - Section 5.10: questions 2, 14.

Homework 5, due Tuesday February 10th

- Read to the end of section 6.4.
- Prepare for exam 1, this Friday: topics, anything from Chapter 5.
- Do the following book problems, to be handed in during your recitation:
  - Section 5.6: questions 2, 6, 8, 10, 14.
  - Section 6.1: questions 4, 8, 12.