Homework 6

Math 252

Due March 4th at 11:59 PM

Work through the following problems and write your solutions on a separate sheet of paper. **Show all your work.** Half the credit comes from attempting all the problems thoroughly, and I'll select one problem at random to grade on correctness for the other half. Good luck!

Textbook Exercises

3.1: 11, 13, 15, 27, 33, 39, 43, 51, 60

3.3: 134, 136, 137, 139, 140, 142

3.4: 183, 185, 189, 195, 196, 197, 199, 209, 211, 217

An Involved Problem

In this exercise, you'll be solving a particularly complicated integral. This problem is required, and I'll say upfront that **this is the problem I'll grade for credit on this assignment.** I'll provide some hints in the problem, and feel free to ask if you have any questions.

Find $\int \frac{1}{x^3 - 1}\, dx$.

Some hints:

- You'll need to use the difference of cubes formula: $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$.

- You'll need to use partial fractions, u-sub, and possibly trig sub, in some order.
- You'll need to complete a square at some point: $x^2 + bx + c = x^2 + bx + \left(\frac{b}{2}\right)^2 + c - \left(\frac{b}{2}\right)^2 = \left(x - \frac{b}{2}\right)^2 + c - \left(\frac{b}{2}\right)^2$.