Assignment 4 for MA 113 — Calculus I (Spring 2010)

February 23, 2010

Instructions: The purpose of this and subsequent assignments is to develop your ability to formulate and communicate a mathematical argument showing step-by-step reasoning.

Please give a complete, well-written solution to each of the following problems. Your work will be graded for accuracy, completeness, and grammatically correct English.

Your solutions should be neat and legible, stapled, and your name should appear on each sheet. Moreover, on page 1 of your solution, please also indicate your *section number* to ensure that you will receive proper credit for the assignment.

Due Date: Your completed solutions are due on **Friday, March 5, 2010**, at the beginning of lecture.

(1) (6 points) Solve Exercise #69 in Section 3.5 (page 215) of the textbook.

(2) (4 Points) Find all tangent lines to the hyperbola $x^2 - 3y^2 = 18$ that pass through the point $(0, 2)$. Your solution should describe how you know that you have found *all* of the solutions.

Bonus Problem (2 Points)

When Lola gets home after a long day at the university, she decides to run for a while. She begins running right outside her front door. First she runs on a level road, then she comes to a hill and runs to the top. When she gets to the top, she turns around and she runs back exactly the way she came. Now, on level ground, Lola can run at a speed of 10 km an hour. Uphill, she runs 7.5 km an hour and downhill 15 km an hour. Upon her return home, she notices that she had run for exactly two hours. How far did Lola run in total? (It seems that there is not enough information here to solve the problem, but there is.)