MATH 186: Homework 3
Winter 2008

Due: Wednesday, Jan. 30 before class

> "It is not knowledge, but the act of learning, not possession but the act of getting there, which grants the greatest enjoyment."
>
> –Karl Friedrich Gauss

From the textbook:

The problems in parentheses are warm-up problems. You won't turn these in, but they are good practice and can help with the graded problems. The problems in **bold** are the graded problems that you will hand in.

§4.24: (4(ac)) **4(bd)**

§4.26: (1(ac),2(ac),8(a)) **1(b),2(b),4,7(a),8(b)**

The problems below are "extra": if you do only the textbook problems in bold above (and do them correctly) you will receive full credit for this homework. You should only work on these after you've completed the textbook problems.

Outside the box:

1. Section 4-26 Problem 6. (Hint: Start by using Theorem 13. Fix a "good" subdivision similar to $\bar{x}_1 < \cdots < \bar{x}_p$ in the proof of Theorem 25. Then follow the proof of Theorem 25 keeping in mind that arguments using glb needs to be changed to work with lub.)

2. There are 2008 locker doors down a corridor at Higher Math High school, one for each of the 2008 students. On graduation day, the students line up at one end of the hall. The first student in line walks down the hall and opens every locker door. The second student in line walks down the hall and closes every other door. The third student now walks along, and "changes" every third door: if it is open she closes it, and if it is closed she opens it. In general, student i visits every ith door: $i, 2i, 3i, \ldots$ until they reach the end of the hall. If a door is closed, they open it, if it is open, they close it.

   By the time student number 2008 finishes walking down the hall, which lockers are open?