Math 225 Homework

Due 4pm on Fri Feb 20, 2009.

When writing up your solutions, pay attention to what you write. I'm interested in seeing proofs written rigorously. What does this mean? Good proofs are:

- Correct — ideally, every statement should follow from axioms or from what has been proved before.
- Concise — a proof should not contain anything that is not necessary.
- Readable — Human beings both write and read proofs. Don't be afraid to explain in words what you are doing. For example, before embarking on a long computation, it is a good idea to explain what you are doing and why you are doing it.

1 Problems

1. Recall the projection maps $\pi_i : \mathbb{R}^n \to \mathbb{R}$ for $i = 1, 2, \ldots, n$ defined by
$$\pi^i(x_1, x_2, \ldots, x_n) = x_i.$$
Use the definition of differentiability (on p. 16) to show that π^i is differentiable. (Hint: take a guess at what the linear transformation $\lambda : \mathbb{R}^n \to \mathbb{R}$ is, then show it satisfies the definition.) What is the matrix that represents $\lambda(h)$?
2. Problem 2.1 page 17 Spivak.
3. Problem 2.3 page 17 Spivak. (Hint: modify the arguments we gave in class for Problem 2.2.)
4. Problem 2.7 page 17 Spivak.

2 Reminder — find my office and have a brief chat

This task is worth one quarter of your grade for HW 1. As I have been ill and not around very much, you have until February 28 to complete it.

This means you'll know where my office is when you have questions. I'll touch base with all of you, learning the names of students I haven't already met and catching up with those of you I've taught previously.