M305G – Precalculus

Summer II 2008

Problem Set 6 – Due Wednesday, July 28

"If others would but reflect on mathematical truths as deeply and as continuously as I have, they would make my discoveries." – Karl Friedrich Gauss

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I don't have much of a pep talk for you this time, except for the following: **do not** underestimate the amount of time it will take for you to do these problems! The problems in section 4.3 are especially complicated.

Section 4.3: 10, 18, 22, 26, 28.
On these problems, I want you to carefully follow the seven-step method discussed in class and in the text. I expect you to **read through the examples in the text** so that you can get a feel for some of the twists and turns that you can run into. I'm not assigning any problems from section 4.2 because if you can do the problems in 4.3 correctly, then you've got all the skills covered in 4.2.

Section 4.4: 6, 18, 24, 27, 31, 34, 39, 44, 52
Remember, on the odd-numbered problems it's especially important for you to show your work, since the answers are available in the back of the book.

Bonus Problems

B1. Suppose that x is a positive real number. Show that

$$x + \frac{1}{x} \geq 2.$$

When is the expression on the left equal to 2? (*Note:* The theorem that you are proving here is a version of the *AM-GM Inequality*. The "AM" and "GM" stand for "arithmetic mean" and "geometric mean," respectively.)

B2. In the year 2007, Serena lost her first five tennis matches. She then won her next two, lost the one after that, won the two after that, lost the one after that, and so on, continuing in cycles of two wins and one loss. Assuming that Serena played enough matches to get her win percentage over 55%, how many matches did Serena have to play in order to achieve a win percentage better than 55%?