

Math 111.17 Fall 2002
Assignment #2

This assignment is due at the beginning of class on **Tuesday, September 17, 2002**. You are encouraged to form study groups and collaborate with others on this assignment. However, the final work you submit must be your own. A piece of advice: *the assignments are worth very little in the computation of your final grade. It is better to suffer through not understanding something now, rather than copying from a friend just for the sake of completion. You will not have that luxury on the exams.* You must submit all problems that are marked with an asterisk (*). **YOUR ASSIGNMENT MUST BE STAPLED AND PROBLEM NUMBERS CLEARLY LABELLED. UNSTAPLED ASSIGNMENTS WILL NOT BE ACCEPTED!**

1. Practice problems.

- Section 2.1 #9
- Section 2.2 #3, 7, 15, 19
- Section 2.3 #1, 11, 23, 25, 27, 33
- Section 2.4 #5, 11, 15, 29, 31, 37, 41

2. * Problems to hand in.

- Section 2.1 #2, 8
- Section 2.2 #4, 6, 10
- Section 2.3 #8, 14, 20, 30, 38
- Section 2.4 #14, 28, 34

3. * Computing limits. These involve algebraic manipulations of the kind discussed in the appendix and during the first week of class.

- Section 2.3 #9, 10, 12, 16, 17, 18, 19

4. * Suppose that $d \geq 1$ and that the function $f(x)$ satisfies

$$d^x \leq f(x) \leq 2d(2d - 1)^{x-1}$$

for all $x \geq 0$.

(a) If $\lim_{x \rightarrow \infty} \frac{\ln f(x)}{x} = \alpha$, show that $\lim_{x \rightarrow \infty} f(x)^{1/x} = \beta$ where $\beta = e^\alpha$.

(b) Use your result from (a) to show that $d \leq \beta \leq 2d - 1$. *Hint: Use the theorem on page 116.*