Math 231 B,C. Fall 2009. Homework from lecture on 9/02.

INSTRUCTIONS. On every homework this semester, you must $\boxed{\text{put a box around each answer}}$. Also show your working (but don't put it in a box). You do not need to box your graphs, or box whole proofs.

And **staple** your homework together. Thank you.

To do, but not turn in:

2.3 #52

2.6 #45 [so be cautious about relying on graphs!]

To turn in:

1. 2.3 #56 (hint: Limit Law 4 on p. 99 "the limit of the product equals the product of the limits"; but note f in the Limit Law is not the same as f in this problem)

2. 2.6 #12a and then evaluate the limit exactly

3. 2.6 #18 [hint: check your answer by graphing]

4. 2.6 #24 [hint: check your answer by graphing]

5. 2.6 #53 [the Squeeze Theorem on p. 105 (Figure 7) also applies to limits as $x \to \infty$]

6. Evaluate $\lim_{x\to\infty} \tanh x = \lim_{x\to\infty} \frac{\sinh x}{\cosh x}$, and sketch the graph of $\tanh x$.

7. (a) Show that $\lim_{x\to\infty} \frac{\ln x}{x} = 0$ [you can use facts proved in class]

(b) Fix $p > 0$ (a positive real number, possibly close to 0). Show that $\lim_{x\to\infty} \frac{\ln x}{x^p} = 0$.

Conclusion: "the logarithm grows slower than any power of x"