HOMEWORK 3: COMMON MISTAKES
MATH 104, SECTION 6

Problem (3): (Squeeze lemma) Let (a_n), (b_n), (c_n) be three sequences satisfying $a_n \leq b_n \leq c_n$ for all n. Suppose that (a_n) and (c_n) both converge with $\lim_{n\to\infty} a_n = \lim_{n\to\infty} c_n = a$. Prove that $\lim_{n\to\infty} b_n = a$.

- Simply saying that there exists some $N > 0$ and then apply it to both (a_n) and (c_n) is not good enough. For any $\epsilon > 0$, you'll get some $N_1 > 0$ for (a_n) and some $N_2 > 0$ for (c_n), and then you can take $N = \max\{N_1, N_2\}$.

Problem (5): Let (a_n) and (b_n) be two convergent sequences with limits a and b respectively. Suppose that $a_n \leq b_n$ for all but finitely many n. Prove that $a \leq b$.

- the most common error was excluding the part about there exists $M > 0$ such that $a_n \leq b_n$ for all $n > M$, or forgetting to include it in the maximum $N = \max\{M, N_1, N_2\}$.