

## Math 301 — Quiz 1

*Summary.* Please do the following problems. You may use your book, notes, and other class materials, but you may not consult with each other or use any other resources. You may use LaTeX or handwrite your solutions. Please do whichever you prefer.

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**Problem 1.** Let  $n \geq 1$  and let  $x_1, \dots, x_n \in \mathbb{R}$ . Use induction to prove that  $|x_1 + \dots + x_n| \leq |x_1| + \dots + |x_n|$ . You need not re-prove any inequalities that were proved in class, but please be explicit in citing any when they are used.

**Problem 2.** Consider the following inequality:  $3^n > 6n$ . It seems like a reasonable inequality (since exponential functions grow faster than linear functions), but we should be careful about which values of  $n$  it's true for.

- a. For which positive integer values of  $n$  do you believe the inequality holds?
- b. Prove your claim using induction.