

Homework 4

Due Friday, September 14 at the beginning of class

Reading.

Sections 3.1, 3.2, 3.3, 3.4

Remark. Your answers should be briefly explained. If you're only writing math symbols, then you're not explaining things — make grammatically correct sentences by adding in just a few English words.

Problems.

1. Prove that $n! > 2^n$ for all $n \geq 4$.
2. (a) If 11 numbers are chosen from 1 to 100, then show that there are two of them whose difference is less than 10.
(b) If 7 numbers are chosen from 1 to 100, then show that there are two of them whose difference is less than 17.
3. Prove that $5n + 5 \leq n^2$ for all integers $n \geq 6$.
4. (a) If 94 people are seated in a row of 100 chairs, then show that some consecutive set of 14 chairs are filled with people.
(b) If 94 people are seated in a *circle* of 100 chairs, then show that some consecutive set of 16 chairs are filled with people.