

## HW 07 Practice Problems

**Due:** DO NOT SUBMIT

**Instructions:**

- These practice problems are helpful to warm-up for the homework itself. They're great to discuss with course staff or class mates because **these problems are not to be handed in** so you may discuss ideas freely without worrying about academic integrity issues. Solutions will be provided immediately with the problems themselves.

**Problem 1 Induction: Factorial Inequality**

Using induction, show that  $n! < n^n$  for all  $n > 1$ . (You may find it helpful to see the practice problem on induction to see what is required of your proof).

**Problem 2 Recursion**

Solve each of the following recurrences by substitution. Assume a base case of  $T(1) = 1$ . As part of your solution, you will need to establish a pattern for what the recurrence looks like after the  $k$ -th substitution. Check that this pattern is consistent with your substitutions, but you do not need to formally prove it is correct via induction.

i  $T(n) = T(n - 2) * 7$