Math 184, Fall 2019
Homework 7

**not to be turned in**

(1) How many positive integers $\leq 1000$ are neither perfect squares nor perfect cubes? [Recall that a perfect square is an integer of the form $n^2$ where $n$ is an integer, and a perfect cube is an integer of the form $n^3$ where $n$ is an integer.]

(2) How many ways are there to list the letters of the word WISCONSIN so that no two consecutive letters are the same?

(3) We have $n > 1$ married couples ($2n$ people in total).
   (a) How many ways can we have the $2n$ people stand in a line so that no person is standing next to their spouse?
   (b) Same as (a), but replace line by circle.

(4) How many necklaces are there of length $n$ using $k$ different colors for the beads where $n$ is:
   (a) 8
   (b) 12
   (c) 30

Hints:
2: When you count ways for letters to appear consecutively, consider merging the repeats together and thinking of them as a single "super" letter.
3: Same as #2: when you count ways for spouses to stand next to each other, imagine they are merged into one person.