1. Compute the number of r-letter sequences that can be formed by using the letters in each location below for each given value of r. Ignore spaces and differences in case.
   (a) Bug Tussle TX: $r = 3$, $r = 4$, $r = 11$.
   (b) Walla Walla WA: $r = 4$, $r = 5$, $r = 12$.
2. Certainly, there are more four-letter sequences that can be formed by using the letters in Bobo Mississippi than can be formed by using the letters in Soso Mississippi. Is the difference more or less than the distance between these two cities in miles, which is 267?
3. Show that at any party with at least two people there must exist at least two people in the group who know the same number of other guests at the party. Assume that each pair of people at the party are either mutual friends or mutual strangers.
4. Let n be a positive integer. Exhibit an arrangement of the integers between 1 and n^2 which has no increasing or decreasing subsequence of length $n + 1$.
5. Let α be an irrational number. Prove that there exist *infinitely many* rational numbers p/q satisfying that are "excellent approximations" in the sense that

$$\left|\alpha - \frac{p}{q}\right| < \frac{1}{q^2}.$$

   (We will prove in class on ~~Friday 3/1~~ **Monday 3/4** that there is at least one such rational number; the goal of this problem is to strengthen that proof slightly to show that there are infinitely many.)