MONT 106N – Identifying Patterns
Group Discussion 2
September 21, 2009

Background and Goals

We have discussed the average and the SD of a list of numbers as ways to measure where the "middle" is (the average) and how "spread out," or diverse, the numbers are (the SD). The goals for today's discussion are to practice using these ideas, and especially to understand their meaning in a rough, "back of the envelope" way (that is, without necessarily doing extensive computations). As on the last group day, you will be handing in one set of solutions from each group *at the end of class*.

A. Which of the two lists below has the larger average? Explain – this does not require any calculation.

   1. $12, 11, 8, 7, 8, 10, 6, 4, 10$

   2. $10, 9, 8, 7, 8, 9, 6, 10, 4.$

B. Each of the following lists has an average of 50. For each one, is the SD probably closer to 1, to 5, or to 10? Explain, and again *no calculation is necessary.*

   1. $59, 41, 48, 52, 53, 47, 50, 57, 43, 50$

   2. $60, 36, 31, 50, 48, 50, 54, 56, 72, 43$

   3. $51, 49, 48, 48, 51, 52, 50, 51, 48, 52$

C. One investigator takes a sample of 100 men in a New York City, and a second investigator takes a sample of 1000 such men. Both investigators make an effort to assure their samples are random and representative of the whole population.

   1. Which investigator will get a bigger average for the heights in her sample? Or should the averages be about the same?

   2. Which investigator will get a bigger SD for the heights in her sample? Or should the SD's be about the same?

   3. Which investigator will probably find a greater *range* of heights in the sample (the range is the biggest height minus the smallest height)?

D. Suppose you have a list of positive numbers.

   1. If you add 10 to each number to make a new list, how do the average and SD of the new list compare with the average and SD of the original list?

   2. Same question if you increase each number in the list by 10% to make a new list.

E. 1. Suppose you took a fair (evenly balanced) coin and tossed it a large number of times recording the faces that come up as numbers: heads = 1, tails = 0 for each toss. Approximately what would you expect the average and SD of your list to be?

2. Try it with 50 throws of an actual coin and see how close you get to your guesses. (You will need to do some calculations here, but you can reduce the work to a minimum by thinking before you pull out the calculator!)