Discussion # 1

1. (Taken from *Elementary Statistics*, (2000)Larson and Farber) You work at a bank and you are asked to recommend the amount of cash to put in a ATM each day. You don't want to put too much (security), or too little (customer irritation). Here are the daily withdrawals (in 100s of dollars) for a period of 30 days.

72	84	61	76	104	76	86	92	80	88	98	76	97	82	84
67	70	81	82	89	74	73	86	81	85	78	82	80	91	83

   If you are willing to run out of cash for 10% of the days, how much should you put in the ATM? If you put \$9,000 in the ATM, what percent of the days in a month should you expect to run out of cash?

2. Assume you have a data set with 10 points, $x_1, x_2, \ldots, x_{10}$. Let $\bar{x}$ be the average of the sample.

   - Let $y_1, y_2, \ldots, y_{10}$ be a new data set with $y_i = x_i + 5$ for $i = 1, \ldots, n$ (i.e. we are adding 5 units to each entry of the first data set). Write $\bar{y}$, the average of the new sample, in terms of $\bar{x}$.
   - Let $z_1, z_2, \ldots, z_{10}$ be a new data set with $z_i = 5x_i$ for $i = 1, \ldots, n$ (i.e. we are multiplying by 5 units each entry of the first data set). Write $\bar{z}$, the average of the new sample, in terms of $\bar{x}$.

3. The mean age of a sample of people from an area A, is 45 years old with a standard deviation of 2.5 years, while the mean age of a sample of people from area B is 55 years old with a standard deviation of 4 years. Indicate if the following statements are true or false:

   - The size of the sample taken from area A is larger than the size of the sample taken from area B.
   - Any person in area A is younger than any person in area B.
   - Assume both sample sizes are 100. If both samples were combined as one single sample from a population, the new average would be 50.
   - Assume the two sample sizes are different. If both samples were combined as one single sample from a population, the new average would be 50.
   - Assume that the histogram of the sample from area A is skewed. Approximately 95% of the people in the sample taken from area A are between 40 and 50 years old.
   - Assume that the histogram of the sample from area B is skewed. At least 75% of the people in the sample taken from area B are between 47 and 63 years old.