

PLSc 724 Homework #1

Answer the following questions adapted from the text: Principals and Procedures of Statistics - A Biometrical Approach: 3rd Edition. 1997. R.G.D. Steel, J.H. Torrie, and D.A. Dickey.

To facilitate grading of assignments, please write on only one side of the page.

- Classify the following variables as qualitative or quantitative-discrete or quantitative-continuous: eye color, insect counts, number of errors per pupil in a spelling test, tire-miles to first puncture, possible yield of corn from a given field, number of children born in the nearest hospital on New Year's Day, possible number of heads from tossing 50 coins, number of fish in a pond.
- In 10 tosses of seven coins, the numbers of heads were 2, 6, 2, 2, 5, 3, 5, 3, 3, 4. If the observations are denoted by Y_1, Y_2, \dots, Y_n :
 - What is the value of n ?
 - What is the value of Y_2 ?
 - What is the value of Y_7 ?
 - For what values of i does $Y_i = 2$? 3 ? 4 ?
 - Distinguish between Y_{i-1} and $Y_i - 1$.
 - What do Y_{i-1} and $Y_i - 1$ equal for $i = 2$?
 - Write the observations as a vector.
- A certain instructor asked the girls in his class to estimate his weight. Their responses were 190, 230, 105, 180, 130, 160, and 170 pounds.
 - Compute the sample mean.
 - What is the sample median?
- The boys in the class of question 3 estimated their instructor's weight as 150, 195, 175, 147, 175, 170, 195, 170, and 190 pounds.
 - Compute the sample mean.
 - What is the sample median?
- Suppose we are given $\bar{Y}_1 = 37$, $\bar{Y}_2 = 41$, and $\bar{Y}_3 = 28$ based on $n_1=50$, $n_2=20$, and $n_3=10$ observations, respectively. If you are required to choose a single mean as best, what is your choice and why?
- Using the information provided in question 5, answer the following questions:
 - Compute the weighted mean of these means using weights equal to the sample sizes.
 - What were the three original sample totals?

7. One method of sampling fish in a lake is to kill them all by the use of rotenone, collect them in buckets, and then take a random sample of buckets. In one such experiment, a random sample of two buckets out of 20 was taken and all fish in each bucket were measured for length in inches. The data were as follows:

Sample A: 5 fish of 5 inches, 19 of 6 inches, 19 of 7 inches, 8 of 8 inches, and 3 of 9 inches; $n=54$

Sample B: 10 fish of 5 inches, 27 of 6 inches, 15 of 7 inches, 6 of 8 inches, and 3 of 9 inches; $n=61$

For each sample compute the weighted mean.

8. Using the data from question 3:

- Compute s^2
- Compute s .
- Compute the range.
- Compute $s_{\bar{y}}^2$
- Compute $s_{\bar{y}}$

9. Using the data from question 4:

- Compute s^2
- Compute s .
- Compute the range.
- Compute $s_{\bar{y}}^2$
- Compute $s_{\bar{y}}$

10. Given Y_1 and Y_2 are random variables with $E(Y_1) = 10$, $E(Y_2) = 2$, $\sigma_1^2 = 9$ and $\sigma_2^2 = 4$.

- Calculate $E(4Y_1 - 2Y_2 + 6)$
- Calculate $V(4Y_1 - 2Y_2 + 6)$