

INTRODUCTORY STATISTICS: TEST NUMBER 1

Question 1: (60 points)

The number of defective items in 15 recent production lots of 100 items each were as follows:

3, 1, 0, 2, 24, 4, 1, 0, 5, 8, 6, 3, 10, 4, 2

- Calculate the mean number of defectives per lot.
- Array the observations in ascending order. Obtain the median of this data set. Why does the median differ substantially from the mean here? Obtain the range and the interquartile range.
- Calculate the variance and the standard deviation of the data set. Which observation makes the largest contribution to the magnitude of the variance through the sum of squared deviations? Which observation makes the smallest contribution? What general conclusions are implied by these findings?
- Calculate the coefficient of variation for the number of defectives per lot.
- Calculate the standardized values of the ten items. Verify that, except for rounding effects, the mean and variance of these standardized observations are 0 and 1 respectively. How many standard deviations away from the mean is the largest observation? The smallest?

Question 2: (10 points)

A manufacturer of automobile batteries claims that the average length of life for its grade A battery is 60 months. But the guarantee on this brand is for just 36 months. Suppose that the frequency distribution of the life-length data is unimodal and symmetrical and that the standard deviation is known to be 10 months. Suppose further that your battery lasts 37 months. What could you infer, if anything, about the manufacturer's claim?

Question 3: (5 points)

You are tabulating data that classifies a sample of 100 incidents of domestic violence according to the Province of Canada in which each incident occurs. You number the provinces from west to east with British Columbia being number 1 and Newfoundland being number 10. The entire Northern Territory is treated for purposes of your analysis as a province and denoted by number 11. In your tabulation you write down next to each incident the assigned number of the province in which it occurred. Is the resulting column of province numbers a quantitative or qualitative variable?

Question 4: (15 points)

Write down a sentence or two explaining the difference between:

- Populations and samples.
- Populations and processes.
- Elements, observations and variables.

Question 5: (10 points)

Calculate the covariance and the correlation coefficient between the following variables.

X	Y
2	4
3	1
5	0