

Section 2.3

Definition: A stem-and-leaf display is a method of exploratory data analysis that is used to rank order and arrange data into groups.

Exercise 1. Mr. V has finished grading and recording all of the scores for a difficult exam. Here are the scores: 53, 94, 90, 77, 83, 98, 75, 82, 94, 79, 71, 76, 90, 87, 71, 72, 71, 86, 96, 94, 82, 70, 81, 88, 84, 91, 90, 90, 90, 65, 100, 89. He now needs to arrange the scores to determine whether the exam should be curved. In order to do this, he constructs a stem-and-leaf plot.

Class Exercise 1. Construct a stem-and-leaf plot for the following values: 49, 34, 43, 41, 27, 59, 46, 58, 21, 23, 49, 36, 39, 45, 55, 50, 28, 33, 22, 23, 37, 56, 22, 51, 51, 38, 25, 23, 38, 43, 20, 37, 47, 52, 21, 46, 37, 38, 40, 60.

Student Feedback

My teaching methods are (I hope) continually subject to improvement. If you have any comments, suggestions, or ideas, please email them to me at Sithparan.Vanniasegaram@evc.edu.

Homework

C problems

Section 2.3: 1(a), 7, 9

B problems

Section 2.3: 1(b), 3, 5(a), 5(b)

Section 3.1

Definition: A **measure of center** is a value at the center or middle of a data set.

We will look at three measures of center: mode, median, and mean.

Definition: The **mode** of a data set is the value that occurs most frequently.

Exercise 4. What is the mode of 1, 4, 5, 1, 1, 4, 6, and 7?

Remark: The mode is not used as frequently as the mean and the median are.

Exercise 5. What is the mode of 1, 2, 4, 1, and 2?

Class Exercise 2. What are the modes for the following sets of numbers?

(a) 3, 1, 9, 8, 1, and 8.

(b) 2, 1, 7, 4, 3, and 7.

(c) 1, 10, 5, 9, 3, 7, and 5.

Definition: The **median** is the central value of an ordered distribution.

To find the median, first *sort* the values (arrange them in order), then follow one of these two procedures:

1. If the number of data values is odd, the median is the number located in the exact middle of the list.

2. If the number of data values is even, the median is found by computing the mean of the two middle numbers.

Exercise 6. Find the median of 1, 9, 20, 13, and 17.

Exercise 7. Find the median of 13, 10, 7, 1, 6, and 4.

Class Exercise 3. Find the median of the following groups of numbers:

(a) 39, 10, 24, 19, 12, and 17.

(b) 30, 21, 30, 34, 21, 10, 23, and 20.

(c) 10, 60, 12, 19, 20, 11, 18, and 16.

Definition: The **arithmetic mean**, or the mean, of a set of data is the measure of center found by adding the data values and dividing the total by the number of data values.

The formulas for the sample mean and the population mean can be expressed as follows:

$$\begin{aligned}\text{sample mean} &= \frac{\Sigma x}{n} = (\text{sum of data values})/(\text{number of data values in the sample}). \\ \text{population mean} &= \frac{\Sigma x}{N} = (\text{sum of data values})/(\text{number of data values in the population}).\end{aligned}$$

Notation: Σ denotes the sum of a set of data values.

Notation: \bar{x} denotes the mean of a set of sample values.

Notation: μ denotes the mean of all values in a *population*.

Exercise 8. Suppose a sample consists of the numbers 1, 4, and 13. Find the mean of this sample.

Exercise 9. Suppose a population consists of the numbers 10, 1, 2, and 7. Find the mean of this population.

Class Exercise 4. Find the mean of 2, 7, 10, and 21.

Class Exercise 5. Find the mean of 1, 2, 3, 4, and 5.

Class Exercise 6. Find the mean and the median for the following two sets:

(a) 1, 1, 1, 1

(b) 1, 1, 1, 1, 95

Class Exercise 7. During contract negotiations, a company seeks to change the number of sick days employees may take, saying that the annual “average” is 7 days of absence per employee. The union negotiators counter that the “average” employee misses only 3 days of work each year. Explain how both sides might be correct, identifying the measure of center you think each side is using and why the difference might exist.

Class Exercise 8. One variable in a study measures how many serious motor vehicle accidents a subject has had in the past year. Explain why the mean would likely be more useful than the median for summarizing the responses of the 60 subjects.

Definition

$$\text{Weighted average} = \frac{\sum xw}{\sum w},$$

where x is a data value and w is the weight assigned to that data value. The sum is taken over all data values.

Exercise 11. Suppose you have a basket of fruit consisting of ten apples and five oranges. Each apple weighs 2 pounds and each orange weighs one pound. What is the average weight of the fruits of the basket?

Class Exercise 9. In your biology class, your final grade is based on several things: a lab score, scores on two major tests, and your score on the final exam. There are 100 points available for each score. However, the lab score is worth 25% of your total grade, each major test is worth 22.5%, and the final exam is worth 30%. Compute the weighted average for the following scores: 92 on the lab, 81 on the first major test, 93 on the second major test, and 85 on the final exam. (#26)

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Homework

C problems

Section 3.1: 5, 7, 19 - 27 ODD

B problems

Section 3.1: 1, 3

A problems

Section 3.1: 9-17 ODD