

## 2.13: Homework

119.

Javier and Ercilia are supervisors at a shopping mall. Each was given the task of estimating the mean distance that shoppers live from the mall. They each randomly surveyed 100 shoppers. The samples yielded the following information.

Table 2.13.81

	Javier	Ercilia
$\bar{x}$	6.0 miles	6.0 miles
$s$	4.0 miles	7.0 miles

- How can you determine which survey was correct ?
- Explain what the difference in the results of the surveys implies about the data.
- If the two histograms depict the distribution of values for each supervisor, which one depicts Ercilia's sample? How do you know?

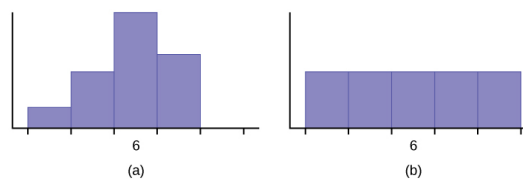


Figure 2.24

Use the following information to answer the next three exercises: We are interested in the number of years students in a particular elementary statistics class have lived in California. The information in the following table is from the entire section.

Table 2.13.82

Number of years	Frequency	Number of years	Frequency
7	1	22	1
14	3	23	1
15	1	26	1
18	1	40	2
19	4	42	2
20	3		
			Total = 20

120.

What is the *IQR*?

- 8
- 11
- 15
- 35

121.

What is the mode?

- 19
- 19.5
- 14 and 20

d. 22.65

122.

Is this a sample or the entire population?

- a. sample
- b. entire population
- c. neither

123.

Twenty-five randomly selected students were asked the number of movies they watched the previous week. The results are as follows:

Table 2.13.83

# of movies	Frequency
0	5
1	9
2	6
3	4
4	1

- a. Find the sample mean  $\bar{x}$ .
- b. Find the approximate sample standard deviation,  $s$ .

124.

Forty randomly selected students were asked the number of pairs of sneakers they owned. Let  $X$  = the number of pairs of sneakers owned. The results are as follows:

Table 2.13.84

$X$	Frequency
1	2
2	5
3	8
4	12
5	12
6	0
7	1

- a. Find the sample mean  $\bar{x}$
- b. Find the sample standard deviation,  $s$
- c. Construct a histogram of the data.
- d. Complete the columns of the chart.
- e. Find the first quartile.
- f. Find the median.
- g. Find the third quartile.
- h. What percent of the students owned at least five pairs?
- i. Find the 40<sup>th</sup> percentile.
- j. Find the 90<sup>th</sup> percentile.

- k. Construct a line graph of the data
- l. Construct a stemplot of the data

125.

Following are the published weights (in pounds) of all of the team members of the San Francisco 49ers from a previous year.

177; 205; 210; 210; 232; 205; 185; 185; 178; 210; 206; 212; 184; 174; 185; 242; 188; 212; 215; 247; 241; 223; 220; 260; 245; 259; 278; 270; 280; 295; 275; 285; 290; 272; 273; 280; 285; 286; 200; 215; 185; 230; 250; 241; 190; 260; 250; 302; 265; 290; 276; 228; 265

- a. Organize the data from smallest to largest value.
- b. Find the median.
- c. Find the first quartile.
- d. Find the third quartile.
- e. The middle 50% of the weights are from \_\_\_\_\_ to \_\_\_\_\_.
- f. If our population were all professional football players, would the above data be a sample of weights or the population of weights? Why?
- g. If our population included every team member who ever played for the San Francisco 49ers, would the above data be a sample of weights or the population of weights? Why?
- h. Assume the population was the San Francisco 49ers. Find:
  - i. the population mean,  $\mu$ .
  - ii. the population standard deviation,  $\sigma$ .
  - iii. the weight that is two standard deviations below the mean.
  - iv. When Steve Young, quarterback, played football, he weighed 205 pounds. How many standard deviations above or below the mean was he?
- i. That same year, the mean weight for the Dallas Cowboys was 240.08 pounds with a standard deviation of 44.38 pounds. Emmitt Smith weighed in at 209 pounds. With respect to his team, who was lighter, Smith or Young? How did you determine your answer?

126.

One hundred teachers attended a seminar on mathematical problem solving. The attitudes of a representative sample of 12 of the teachers were measured before and after the seminar. A positive number for change in attitude indicates that a teacher's attitude toward math became more positive. The 12 change scores are as follows:

3; 8; -1; 2; 0; 5; -3; 1; -1; 6; 5; -2

- a. What is the mean change score?
- b. What is the standard deviation for this population?
- c. What is the median change score?
- d. Find the change score that is 2.2 standard deviations below the mean.

127.

Refer to **Figure 2.13.25** determine which of the following are true and which are false. Explain your solution to each part in complete sentences.

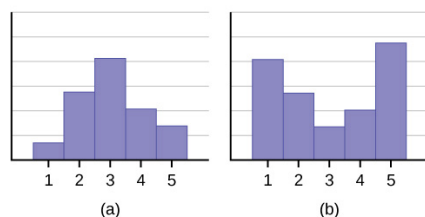


Figure 2.25

- a. The medians for both graphs are the same.
- b. We cannot determine if any of the means for both graphs is different.
- c. The standard deviation for graph b is larger than the standard deviation for graph a.

d. We cannot determine if any of the third quartiles for both graphs is different.

128.

In a recent issue of the *IEEE Spectrum*, 84 engineering conferences were announced. Four conferences lasted two days. Thirty-six lasted three days. Eighteen lasted four days. Nineteen lasted five days. Four lasted six days. One lasted seven days. One lasted eight days. One lasted nine days. Let  $X$  = the length (in days) of an engineering conference.

- Organize the data in a chart.
- Find the median, the first quartile, and the third quartile.
- Find the 65<sup>th</sup> percentile.
- Find the 10<sup>th</sup> percentile.
- The middle 50% of the conferences last from \_\_\_\_\_ days to \_\_\_\_\_ days.
- Calculate the sample mean of days of engineering conferences.
- Calculate the sample standard deviation of days of engineering conferences.
- Find the mode.
- If you were planning an engineering conference, which would you choose as the length of the conference: mean; median; or mode? Explain why you made that choice.
- Give two reasons why you think that three to five days seem to be popular lengths of engineering conferences.

129.

A survey of enrollment at 35 community colleges across the United States yielded the following figures:

6414; 1550; 2109; 9350; 21828; 4300; 5944; 5722; 2825; 2044; 5481; 5200; 5853; 2750; 10012; 6357; 27000; 9414; 7681; 3200; 17500; 9200; 7380; 18314; 6557; 13713; 17768; 7493; 2771; 2861; 1263; 7285; 28165; 5080; 11622

- Organize the data into a chart with five intervals of equal width. Label the two columns "Enrollment" and "Frequency."
- Construct a histogram of the data.
- If you were to build a new community college, which piece of information would be more valuable: the mode or the mean?
- Calculate the sample mean.
- Calculate the sample standard deviation.
- A school with an enrollment of 8000 would be how many standard deviations away from the mean?

Use the following information to answer the next two exercises.  $X$  = the number of days per week that 100 clients use a particular exercise facility.

Table 2.13.85

$x$	Frequency
0	3
1	12
2	33
3	28
4	11
5	9
6	4

130.

The 80<sup>th</sup> percentile is \_\_\_\_\_

- 5
- 80
- 3
- 4

131.

The number that is 1.5 standard deviations BELOW the mean is approximately \_\_\_\_\_

- a. 0.7
- b. 4.8
- c. -2.8
- d. Cannot be determined

132.

Suppose that a publisher conducted a survey asking adult consumers the number of fiction paperback books they had purchased in the previous month. The results are summarized in the Table 2.13.86

# of books	Freq.	Rel. Freq.
0	18	
1	24	
2	24	
3	22	
4	15	
5	10	
7	5	
9	1	

Table 2.86

- a. Are there any outliers in the data? Use an appropriate numerical test involving the *IQR* to identify outliers, if any, and clearly state your conclusion.
- b. If a data value is identified as an outlier, what should be done about it?
- c. Are any data values further than two standard deviations away from the mean? In some situations, statisticians may use this criteria to identify data values that are unusual, compared to the other data values. (Note that this criteria is most appropriate to use for data that is mound-shaped and symmetric, rather than for skewed data.)
- d. Do parts a and c of this problem give the same answer?
- e. Examine the shape of the data. Which part, a or c, of this question gives a more appropriate result for this data?
- f. Based on the shape of the data which is the most appropriate measure of center for this data: mean, median or mode?

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