

Find all the measures of the center and variation of the following data set. Round your answer to one more decimal place than the original data. Show your work.

- 1) Jeanne is currently taking college zoology. The instructor often gives quizzes. On the past five quizzes, Jeanne got the following scores:

1 17 5 18 1

Solve the problem.

- 2) The federal government requires a car manufacturer to have a minimum miles per gallon (mpg) average over the models it makes. Suppose that the mpg's for the five models of a manufacturer are 19, 21, 22, 28, and 18, and the government requirement is 24 mpg. The sixth model is to be designed to meet the government requirement. What must the new mpg of this model be to meet the requirement?
- 3) The mathematics SAT scores of the seven students in a mathematics seminar are 524, 559, 580, 586, 615, 628, and 636. Suppose that the student with the score 524 drops the seminar and is replaced by a student with a score of 782. What will happen to the mean and the median scores of the class?
- 4) The mathematics SAT scores of the seven students in a mathematics seminar are 536, 551, 575, 596, 615, 625, and 633. Suppose the student with the score 536 drops the seminar and is replaced by a student with a score that is a low-end outlier. What will happen to the mean and the median scores of the class?
- 5) The host of a dinner party purchases wine based on the weighted average of clarity (9%), bouquet (3%), friendliness to the palate (8%), storageability of opened bottles (40%), and price (40%). Suppose that Bone Ranch Wave has scores in these categories of 4, 5, 3, 8, and 9, respectively. What is its rating?

Provide an appropriate response.

- 6) The mean of a data set is always/sometimes/never (select one) one of the data points in a set of data. Explain your answer with brief examples.

Solve the problem.

- 7) The following data set is the GPA's of the students in a statistics class.

1.93, 1.99, 2.00, 2.04, 2.12, 2.34, 2.55, 2.55, 2.75, 2.75,

2.80, 2.80, 2.85, 3.02, 3.12, 3.22, 3.31, 3.33, 3.45, 3.69

What value is the 25th percentile?

- 8) Suppose that your income is at the 69th percentile of wage earners in the United States. What percent of wage earners make more than you?

- 9) The weights (in pounds) of 30 newborn babies are listed below.
- Construct (by hand, and with the calculator) a boxplot for the data set. Show work for identifying outliers.
 - What is the range?
 - What is the range of the middle 50% of the distribution?

5.5 5.7 5.8 5.9 6.1 6.1 6.3 6.4 6.5 6.6
 6.7 6.7 6.7 6.9 7.0 7.0 7.0 7.1 7.2 7.2
 7.4 7.5 7.7 7.7 7.8 8.0 8.1 8.1 8.3 8.7

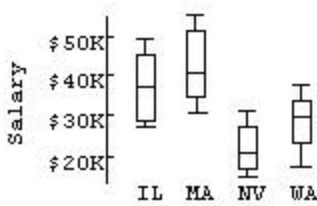
Identify potential outliers, if there are any, in the given data.

- 10) The test scores of 15 students are listed below.

36 54 53 65 66
 69 70 72 75 77
 78 82 87 90 99

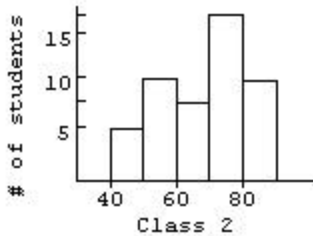
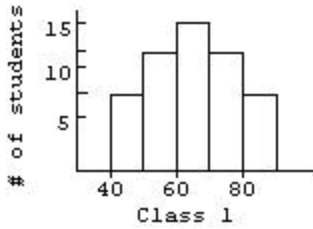
Provide the appropriate response.

- 11) Describe what these boxplots tell you about the relationship between the state you live in and your salary, based on the same occupation.



- 12) Consider the boxplots from the previous problem. Classify each statement as True or False.
- The range of salaries in Illinois and Massachusetts is almost the same.
 - For the Nevada distribution of salaries, the number of salaries between Q2 and Q3 is larger than the number of salaries between the minimum and Q1.
 - In Massachusetts, about 25% of the salaries are lower than \$35,000.
 - The mean salary in Washington state is about \$30,000.
 - In Massachusetts, the mean salary is higher than the median salary.

Two statistics classes (50 students each) took the same test. Shown below are histograms of the scores for the classes. Use the histograms to answer the question.



13) Which class had the higher mean score?

14) Which class has the smaller standard deviation?

15) Which class had the higher median score?

Use summary statistics to answer the question.

16) Here are the summary statistics for the monthly payroll for an accounting firm: lowest salary = \$30,000, mean salary = \$70,000, median = \$50,000, range = \$120,000, IQR = \$60,000, first quartile = \$35,000, standard deviation = \$40,000.

Do you think the distribution of salaries is symmetric, skewed to the left, or skewed to the right? Explain why.

17) Here are the summary statistics for the monthly payroll for an accounting firm: lowest salary = \$15,000, mean salary = \$35,000, median = \$25,000, range = \$60,000, IQR = \$30,000, first quartile = \$17,500, standard deviation = \$20,000.

Between what two values are the middle 50% of the salaries found?

18) Here are the summary statistics for the monthly payroll for an accounting firm: lowest salary = \$60,000, mean salary = \$140,000, median = \$100,000, range = \$240,000, IQR = \$120,000, first quartile = \$70,000, standard deviation = \$80,000.

Suppose that business has been good and the company gives every employee a \$10,000 raise. Give the new value of each of the summary statistics.

Use the calculator to find the mean, median, and standard deviation for each of the two samples, then compare the two sets of results.

- 19) The Body Mass Index (BMI) is measured for a random sample of men and women. Interpret the results by determining whether there is a difference between the two data sets .

Men	24	23.5	20	27	29	22.5	28	24
Women	18	20	24	25	27	21	22	25

Solve the problem.

- 20) The data below consists of the heights (in inches) of 20 randomly selected women. Find the 10% trimmed mean of the data set. The 10% trimmed mean is found by arranging the data in order, deleting the bottom 10% of the values and the top 10% of the values and then calculating the mean of the remaining values.

68	62	67	61	65
65	70	67	62	63
61	64	75	63	60
59	64	68	65	71

- 21) The heights of a group of professional basketball players are summarized in the frequency distribution below. Use the calculator to find the mean and the standard deviation. Round your answer to one decimal place.

Height (in.)	Frequency
70 - 71	3
72 - 73	7
74 - 75	16
76 - 77	12
78 - 79	10
80 - 81	4
82 - 83	1

Solve the problem.

- 22) The heights of the adults in one town have a mean of 67.5 inches and a standard deviation of 3.4 inches. What can you conclude about the percentage of adults in the town whose heights are between 60.7 and 74.3 inches?
 a) from Chebyshev's theorem
 b) from the Empirical rule
- 23) The ages of the members of a gym have a mean of 48 years and a standard deviation of 10 years. What can you conclude about the percentage of gym members aged between 18 and 78?
 a) from Chebyshev's theorem
 b) from the Empirical rule

Draw the Normal model and use the 68-95-99.7 Rule to answer the question.

- 24) The systolic blood pressure of 18-year-old women is normally distributed with a mean of 120 mmHg and a standard deviation of 12 mmHg. What percentage of 18-year-old women have a systolic blood pressure between 96 mmHg and 144 mmHg?

25) The amount of Jen's monthly phone bill is normally distributed with a mean of \$55 and a standard deviation of \$8. Fill in the blanks.

68% of her phone bills are between \$___ and \$___.

Use the range rule of thumb to approximate the standard deviation.

26) 496, 598, 503, 528, 565, 601, 576, 543

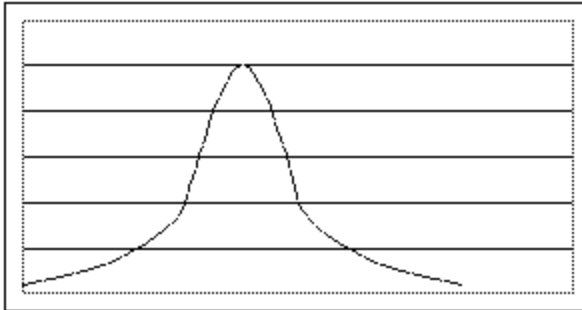
Select the requested distribution.

27) a) Which of the distributions has the largest range?

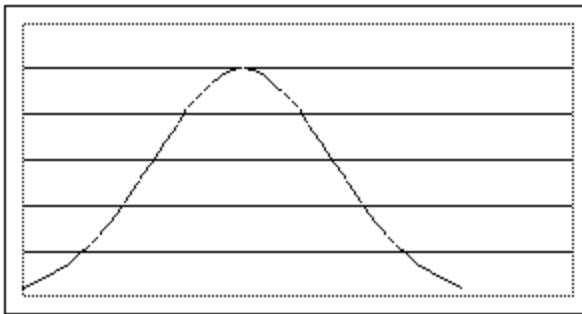
b) Which of the distributions has the greatest variation?

b) Which one has the largest mean?

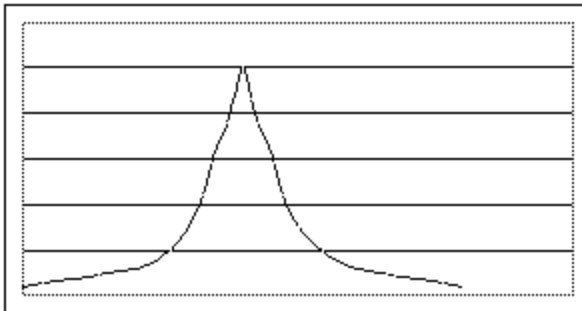
A)



B) a) They all have the same range. b) B has the largest standard deviation. c) They all have the same mean



C)



Provide an appropriate response.

28) Consider the distribution of heights of all the NBA players. What would you expect the shape of the distribution to be?

A) Skewed left

B) Skewed right

C) Symmetric

29) Consider the distribution of mathematics SAT scores of students in honors calculus at a liberal arts college. What would you expect the shape and variation of the distribution to be?

A) Skewed right with considerable variation

B) Symmetric with large variation

C) Symmetric with little variation

D) Skewed left with little variation

30) The distribution of prices of houses is (select one)

a) bell shaped

b) Uniform

c) skewed to the left

d) right skewed

Which measure of the center is more appropriate to use? Explain why. Use the word resistant in your explanation.

A) Right skewed

31) Two companies produce a certain type of light bulbs with a mean life of 500 hours. For company A, the standard deviation is 50 hours and for company B it's 70 hours. You must place an order of 1000 light bulbs of that type. Which company would you order from? Explain why.

A) company A

32) Assume that the IQ scores of a group of students has a mean of $\mu = 100$ and a standard deviation of $s = 15$. Show all your

a) Use the Chebyshev's theorem to complete the following statements .

At least 75% of the students in this group have an IQ score between _____ and _____ .

At least _____% of the students in this group have an IQ score between 55 and 145.

b) Use the Empirical rule to complete the following:

About 99.7% of the students have IQ scores between _____ and _____

c) According to the Empirical rule about _____% of the IQ scores are between 800 and 1200.

d) Since the distribution of IQ scores is normally distributed (bell shaped) we get a better approximation by using the

Chebyshev's theorem or Empirical rule (circle one)

e) Considering that scores that are MORE than two standard deviations away from the mean are considered unusual, complete the following:

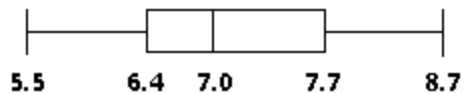
UNUSUALLY LOW IQ scores were below _____ .

UNUSUALLY HIG IQ scores were above _____ .

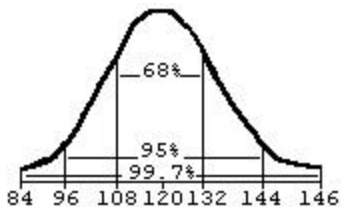
Answer Key

Testname: CHAP3-REV-F07

- 1) 71.8
- 2) 24 mpg
- 3) Both the median and the mean will increase.
- 4) The median will not change, the mean may increase or decrease.
- 5) 7.55
- 6) Answers will vary.
- 7) 2.23
- 8) 31%
- 9)



- 10) 36
- 11) Answers will vary. IL and MA have very comparable salaries. The average salaries for these states are just below \$40K, and their spreads are very close. NV is not very comparable to either IL or MA. The upper 50% of salaries for NV corresponds to the lower 50% of WA salaries.
- 12)
- 13) Class 2
- 14) Class 1
- 15) Class 2
- 16) Skewed to the right; mean is higher than median.
- 17) \$17,500 and \$47,500
- 18) Minimum: 70,000; Mean: 150,000; Median: 110,000; Range: 240,000; IQR: 120,000; Q1: 80,000; SD: 80,000
- 19) Men: 24.75; 24; 24; 24.5
Women: 22.75; 23; 25; 22.5
The measures of the center for the men are much closer together.
- 20) 64.7 in
- 21) 2.8
- 22) The percentage is at least 75%
- 23) The percentage is at least 72.3%
- 24)

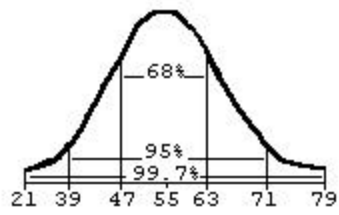


95%

Answer Key

Testname: CHAP3-REV-F07

25)



47, 63

26) 26.25

27) B

28) A

29) C

30) A

31) A

32)