

### Multiple-Choice Questions

1. The section of statistics which involves the collection, organization, summarizing, and presentation of data relating to some population or sample is
  - (a) inferential statistics.
  - (b) descriptive statistics.
  - (c) an example of a frequency distribution.
  - (d) the study of statistics.
2. A subset of the population selected to help make inferences on a population is called
  - (a) a population.
  - (b) inferential statistics.
  - (c) a census.
  - (d) a sample.
3. A set of all possible data values for a subject under consideration is called
  - (a) descriptive statistics.
  - (b) a sample.
  - (c) a population.
  - (d) statistics.
4. The number of occurrences of a data value is called
  - (a) the class limits.
  - (b) the frequency.
  - (c) the cumulative frequency.
  - (d) the relative frequency.
5. A large collection of data may be condensed by constructing
  - (a) classes.
  - (b) a frequency polygon.
  - (c) class limits.
  - (d) a frequency distribution.
6. When constructing a frequency distribution for a small data set, it is wise to use
  - (a) 5 to 20 classes.
  - (b) 5 to 15 classes
  - (d) less than 10 classes.
7. When constructing a frequency distribution for a large data set, it is wise to use
  - (a) 5 to 20 classes.
  - (b) 5 to 15 classes.
  - (c) 5 to 10 classes.
  - (d) less than 10 classes.
8. When straight-line segments are connected through the midpoints at the top of the rectangles of a histogram with the two ends tied down to the horizontal axis, the resulting graph is called
  - (a) a bar chart.
  - (b) a pie chart.
  - (c) a frequency polygon.
  - (d) a frequency distribution.
9. A questionnaire concerning satisfaction with the Financial Aid Office on campus was mailed to 50 students on a university

campus. The 50 students in this survey are an example of a

(a) statistic.

- (b) parameter.  
(c) population.  
(d) sample.

The following information relates to **Problems 10 to 15**.

The Love Your Lawn lawn care company is interested in the distribution of lawns in a certain subdivision with respect to size (in square feet) of the lawn. The following table shows the distribution of the size of the lawns in hundreds of square feet.

SIZE OF LAWN(100 SQUARE FEET)	NUMBER OF LAWNS
10-15	2
15-20	12
20-25	27
25-30	19
30-35	6
35-40	3

10. The class mark for the class 25-30 is

- (a) 24.5.  
(b) 29.5.  
(c) 4.  
(d) 27.5.

- (b) 35.  
(c) 37.  
(d) 39.5.

11. The relative frequency for the class 15-20 is

- (a) 0.2029.  
(b) 0.0290.  
(c) 0.1739.  
(d) 0.4058.

13. The upper class limit for the class 20-25 is

- (a) 24.5.  
(b) 25.5  
(c) 24  
(d) 22

12. The lower class limit for the class 35-40 is

- (a) 34.5.

14. The cumulative frequency for the class 25-30 is

- (a) 41.  
(b) 9.  
(c) 19.  
(d) 60.

15. The cumulative relative frequency for the class 30-35 is

- (a) 0.8696.
- (b) 0.0870.
- (c) 0.1304.
- (d) 0.9565

16. The graphical display with the relative frequencies along the vertical axis that may be

constructed for quantitative data is

- (a) the pie chart.
- (b) the bar chart.
- (c) the histogram.
- (d) all of the above.

17. The cumulative relative frequency for a given class is defined to be

- (a) the proportion of values preceding the given class.
- (b) the proportion of values up to and including the given class.
- (c) the proportion of values for the given class.
- (d) the proportion of values below the given class.

18. A property of a frequency polygon is that

- (a) a histogram is always needed in the construction of the polygon.
- (b) the polygon is made up of line segments.
- (c) the end points of the polygon need not be tied down to the horizontal axis at both ends.

(d) the polygon can be constructed on a pie chart.

19. You are given that the total number of observed values in a frequency distribution is 50

and the frequency of a given class 25-30 is 10. Also, the cumulative frequency of all classes above this given class is 40. The cumulative frequency for this class is (a) 10.

- (b) 50.
- (c) 40.
- (d) 30.

20. If a class in a frequency distribution for a sample of 50 has a frequency of 5, the cumulative relative frequency for this class

- (a) is 0.1000.
- (b) is 0.9000.
- (c) is 0.1111.
- (d) cannot be determined from the given information.

21. If the first five classes of a frequency distribution have a cumulative frequency of 50 from a sample of 58, the sixth and last class must have a frequency count of

- (a) 58.
- (b) 50.
- (c) 7.
- (d) 8.

The following information relates to **Problems 22 to 28**. Hint: Read the examination scores distribution from smallest value to largest value.

The table below shows the distribution of scores on a final elementary statistics examination for a large section of students.

90 and over 5

CLASSES FOR EXAM SCORES

NUMBER OF STUDENTS

80-90	12
70-80	40
60-70	18
50-60	13
40-50	6
Under 40	6

22. The class width is

(a) 9.

(b) 10.

(c) 7.

(d) 1.

23. The class mark for the class 40-50 is

(a) 39.5.

(b) 49.5.

(c) 45.

(d) 9.

24. The relative frequency for the class 80-90 is

(a) 0.1700.

(b) 0.0500.

(c) 0.8300.

(d) 0.1200

25. The lower class limit for the class 50-60 is

(a) 49.5.

(b) 50.

(c) 59.

(d) 59.5.

26. The upper class limit for the class 70-80 is

(a) 69.5.

(b) 70.

(c) 80.

(d) 79.5.

27. The cumulative frequency for the class 60-70 is

(a) 18.

(b) 57.

(c) 43.

(d) 12.

28. The cumulative relative frequency for the class 50-60 is

(a) 0.8800.

(b) 0.1300.

(c) 0.7500.

(d) 0.2500.

29. Can a frequency distribution have overlapping classes?

(a) Sometimes

(b) No

(c) Yes

(d) All of the above

30. An organization of observed data into tabular form in which classes and frequencies are used is called (a) a bar chart.

(b) a pie chart.

(c) a frequency distribution.

(d) a frequency polygon.

31. Given the following stem-and-leaf diagram:

1103

21224

3112333

4111222256

513356

6124

713

The number that occurred the most is

(a) 2.

(b) 42.

(c) 33

(d) 3

### Multiple-Choice Questions

1. A student has seven statistics books open in front of him. The page numbers are as follows:

231,423,521,139,347,400,345. The median for this set of numbers is

(a) 139.

(b) 347.

(c) 346.

(d) 373.5.

2. A cyclist recorded the number of miles per day that she cycled for 5 days. The recordings were as follows: 13, 10,12,10, 11. The mean number of miles she cycled per day is (a) 13.

(b) 11.

(c) 10.

(d) 11.2.

3. An instructor recorded the following quiz scores (out of a possible 10 points) for the 12 students present: 7, 4, 4,7, 2,9,10, 6,7,3,8,5. The mode for this set of scores is

(a) 9.5.

(b) 7.

(c) 6.

(d) 4.3.

4. It is stated that more students are purchasing graphing calculators than any

other type of calculator. Which measure is being used here?

- (a) Mean
- (b) Median
- (c) Mode
- (d) None of the above

5. Which of the following is not a measure of central tendency?

- (a) Mode
- (b) Variability
- (c) Median
- (d) Mean

Use the following frequency distribution for **Problems 6 to 8**.

VALUE	FREQUENCY	20	Error! Bookmark not defined.
29			6
30			6
39			3
44			2

6. The mean of the distribution is

- (a) 32.4.
- (b) 30.
- (c) 39.
- (d) 32.07.

The total deviation from the mean for the data values is

- (a) 0.
- (b) 26.3333.
- (c) 29.5.
- (d) 12.

7. The median of the distribution is

- (a) 4.
- (b) 30.
- (c) 29.5.
- (d) 34.5.

10. The most frequently occurring value in a data set is called the

- (a) spread.
- (b) mode.
- (c) skewness.
- (d) maximum value.

8. The mode of the distribution is

- (a) 29.
- (b) 30.
- (c) 29 and 30.
- (d) none of the above.

9. Given the following data set:

12 32 45 14 24 31

11. A single numerical value used to describe a characteristic of a sample data set, such as the sample median, is referred to as a

- (a) sample parameter.

(b) sample median.

(c) population parameter.

(d) sample statistic.

12. Which of the following is true for a positively skewed distribution?

(a) Mode = Median = Mean

(b) Mean < Median < Mode

(c) Mode < Median < Mean

(d) Median < Mode < Mean

13. Which of the following would be affected the most if there is an extremely large value in the data set?

(a) The mode

(b) The median

(c) The frequency

(d) The mean

14. If the number of values in a data set is even, and the numbers are ordered, then

(a) the median cannot be found.

(b) the median is the average of the two middle numbers.

(c) the median, mode, and mean are equal.

(d) none of the above answers are correct

15. What type of distribution is described by the following information?

Mean = 5.5 median = 5.3 mode = 4.4

(a) Negatively skewed

(b) Symmetrical

(c) Bimodal

(d) Positively skewed

16. What type of distribution is described by the following information?

Mean = 56 median = 58.1 mode = 63

(a) Negatively skewed

(b) Symmetrical

(c) Bimodal

(d) Positively skewed

17. The mean of a set of data is the value that represents

(a) the middle value of the data set.

(b) the most frequently observed value.

(c) the mean of the squared deviations of the values from the mean. (d) the arithmetic average of the data values.

18. The median of an ordered set of data is the value that represents

(a) the middle or the approximate middle value of the data set.

(b) the most frequently observed value.

(c) the mean of the squared deviations of the values from the mean.

(d) the arithmetic average of the data values.

19. Given the following data set:

4,3,7,7,8,7, 4, 8,6. What is the mean value?

(a) 4

(b) 5

(c) 6 ( 4 7

20. Given the following data set:

3,2,7,7,8,7,3, 8,5. What is the median value?

(a) 5

(b) 6

(c) 7

(d) 8

21. Given the following data set: 4,5,7,7,8,6, 5, 8,7. What is the mode?

(a) 4

(b) 5

(c) 6

(d) 7

22. A sample of 10 students was asked by their instructor to record the number of hours they spent studying for a given exam from the time the exam was announced in class.

The following data values were the recorded number of hours:

12 15 8 9 14 8 17 14 8 15

The median number of hours spent studying for this sample is

(a) 10.

(b) 11.

(c) 12.

(d) 13.

23. The numbers of minutes spent in the computer lab by 20 students working on a project are given below:

**Numbers of Minutes**

30| 0 2 5 5 6 6 6 8

40| 0 2 2 5 7 9

50| 0 1 3 5

60| 1 3

The median for this data set is

(a) 400.

(b) 402.

(c) 405.

(d) 407.

24. The numbers of minutes spent in the computer lab by 20 students working on a project are given below:

**Numbers of Minutes**

30| 0 2 5 5 6 6 6 8

40| 0 2 2 5 7 9

50| 0 1 3 5

60| 1 3

The mode for this data set is

(a) 305.

(b) 402.

(c) 306.

(d) 300.

25. The numbers of minutes spent in the computer lab by 20 students working on a project are given below:

**Numbers of Minutes**

30| 0 2 5 5 6 6 6 8

40| 0 2 2 5 7 9

50| 0 1 3 5

60| 1 3

The mean for this data set is

(a) 306.0.

(b) 402.0.

(c) 403.8.

(d) 450.0.

26. A set of exam scores is given below:

**Exam Scores**

4| 5 6 8

5| 3 4 5 6 9

6| 2 3 5 6 6 9 9



7| 0 1 1 3 3 4 5 5 5 7 8

8| 1 2 3 6 9

9| 3 5 7 8.

The mode for this data set is

(a) 75

(b) 78.

(c) 45.

(d) 98.

### Multiple-Choice Questions

1. A sample of 10 students was asked by the instructor to record the number of hours each spent studying for a given exam from the time the exam was announced in class. The following data values were the recorded numbers of hours:

12 15 8 9 14 8 17 14 8 15

The variance for the number of hours spent studying for this sample is

(a) 10.0000.

(b) 9.0000.

(c) 3.4641.

(d) approximately 12.

2. The numbers of minutes spent in the computer lab by 20 students working on a project are given below:

**Numbers of Minutes**

30| 0,2,5,5,6,6,6,8

40| 0, 2, 2,5,7,9

50| 0, 1,3,5

60| 1,3

The range for this data set is

(a) 300.

(b) 303.

(c) 603.

(d) 600.

3. The numbers of minutes spent in the computer lab by 20 students working on a project are given below:

**Numbers of Minutes**

30| 0,2,5,5,6,6,6,8

40| 0, 2, 2,5,7,9

50| 0, 1,3,5

60| 1,3

The standard deviation for this data set is

(a) 101.6.

(b) 403.8.

(c) 306.0.

(d) 500.5.

4. The price increases on 5 stocks were \$7, \$1, \$8, \$4, and \$5. The standard deviation for these price increases is

(a) 2.3.

(b) 2.7.

(c) 3.2.

(d) 4.1.

5. Which of the following is not affected by an extreme value in a data set?

(a) The mean absolute deviation

(b) The median

(c) The range

(d) The standard deviation

6. Given the following set of numbers, what is the variance?

15 20 40 25 35

(a) 9.27

(b) 86.0

(c) 10.37

(d) 107.5

7. Which of the following is the crudest measure of dispersion?

(a) The mean absolute deviation

(b) The variance

(c) The mode

(d) The range

8. Which of the following is not a measure of central tendency?

(a) Mean

(b) Median

(c) Q3

(d) Mode

9. Given the following data set:

12 32 45 14 24 31

The total deviation from the mean for the data values is

(a) 0.

(b) 26.3333.

(c) 29.5.

(d) 12.

10. Given that a sample is approximately bell-shaped with a mean of 60 and a standard deviation of 3, the approximate percentage of data values that is expected to fall between 54 and 66 is

(a) 75 percent

(b) 95 percent.

(c) 68 percent.

(d) 99.7 percent.

11. Given the following frequency distribution

X VALUES

20

29

30

39

44

FREQUENCY

2

4

4

3

2

The variance of the distribution is

(a) 32.07.

(b) 30.

(c) 7.44.

(d) 55.35.

12. Which of the following is a measure of variation?

- (a) Standard deviation
- (b) Midrange
- (c) Mode
- (d) Median

13. The following values are the ages of 15 students in a statistics class:

18 21 25 21 28 23 21 19 24 26 21 24 18 27 23

The standard deviation for this set of data is

- (a) 9.
- (b) 9.6857.
- (c) 21.
- (d) 3.1122.

14. An instructor recorded the following quiz scores (out of a possible 10 points) for the 12 students present:

7 4 4 7 2 9 1 0 6 7 3 8 5

The interquartile range for this set of scores is

- (a) 7.5.
- (b) 6.5.
- (c) 8.
- (d) 3.5.

15. A statement is made that the average distance from the mean in a set of data values is

10. Which measure is being used here?

- (a) The range
- (b) The interquartile range
- (c) The mean absolute deviation

(d) The standard deviation

16. Which of the following is not a measure of dispersion?

- (a) Interquartile range
- (b) Range
- (c) Median
- (d) Coefficient of variation

17. For the data set 8,12,15,20,11,5,21,0, what is the value of the coefficient of variation?

- (a) 62.52 percent.
- (b) 11.5 percent.
- (c) 7.19 percent.
- (d) 159.9 percent.

18. Which of the following statements is correct?

- (a) Two sets of numbers with completely different means and standard deviations may have the same coefficient of variation.
- (b) The most frequently used measure of variation is the standard deviation.
- (c) The range is a crude measure of dispersion, since it involves only the smallest and the largest values in a data set.
- (d) All of the above statements are correct.

19. Given that a sample is approximately bell-shaped with a mean of 25 and a standard deviation of 2, the approximate percentage of data values that are expected to fall between 19 and 31 is

(a) 75 percent.

(b) 95 percent.

(c) 68 percent.

(d) 99.7 percent

20. The interquartile range in an ordered data set is the difference between (a) the median for the entire data set and the median for the lower 50 percent of the data set.

(b) the median for the upper 50 percent of the data set and the median for the entire data set.

(c) the median for the upper 50 percent and the median for the lower 50 percent of the data set.

(d) the maximum value and the minimum value.

21. A single numerical value used to describe a characteristic of a sample data set, such as the sample median, is referred to as a

(a) sample parameter.

(b) sample median.

(c) population parameter.

(d) sample statistic.

22. The standard deviation will always be larger than the mean absolute deviation because

(a) absolute values are not computed for the standard deviation.

(b) the standard deviation is the square root of the variance.

(c) the larger values in the data set receive stronger emphasis when squared

(d) of none of the above.

23. Which of the following is not a property of the standard deviation?

(a) It is affected by extreme values in a data set.

(b) It is the most widely used measure of spread.

(c) It uses all the values in the data set in its computation.

(d) It is always a positive number.

24. For which of the following is the coefficient of variation the smallest?

(a)  $i=10$  and  $s=2$

(b)  $i=14$  and  $s=3$

(c)  $i=30$  and  $s=5$

(d)  $i=39$  and  $s=8$

25. If a distribution has zero variance, which of the following is true?

(a) All the values are positive.

(b) All the values are negative.

(c) The number of positive values and the number of negative values are equal

(d) All the values are equal to each other.

26. The following are given for a set of values:

I. The values ranged from 40 to 95.

11. The median value was 79.

111. 25 percent of the values are less than or equal to a value of 62.

IV. 75 percent of the values are less than or equal to 90.

From the above information, the interquartile range for the data set is

- (a) 55.
- (b) 28.
- (c) 50.
- (d) 33.

27. A sample of 10 students was asked by the instructor to record the number of hours each spent studying for a given exam from the time the exam was

announced in class. The following data values were the recorded number of hours:

12 15 8 9 14 8 17 14 8 15

The mean absolute deviation for the number of hours spent studying for this sample is

- (a) 3.0.
- (b) 1.41.
- (c) 1.33.
- (d) 2.5.

### ANSWER KEY

#### Multiple-Choice Questions

1. (b) 2. (d) 3. (c) 4. (b) 5. (d) 6. (c) 7. (a) 8. (c) 9. (d)  
 10. (d) 11. (c) 12. (b) 13. (b) 14. (d) 15. (d) 16. (c) 17. (b) 18. (b)  
 19. (b) 20. (d) 21. (d) 22. (b) 23. (c) 24. (d) 25. (b) 26. (c)  
 27. (c) 28. (d) 29. (b) 30. (c) 31. (b)

#### Multiple-Choice Questions

1. (b) 2. (d) 3. (b) 4. (c) 5. (b) 6. (d) 7. (b) 8. (c) 9. (a) 10. (b) 11. (d)  
 12. (c) 13. (d) 14. (b) 15. (d) 16. (a) 17. (d)  
 18. (a) 19. (c) 20. (c) 21. (d) 22. (d) 23. (b) 24. (c) 25. (c)  
 26. (a)

#### Multiple-Choice Questions

1. (d) 2. (b) 3. (a) 4. (b) 5. (b) 6. (d) 7. (d) 8. (c) 9. (a) 10. (b) 11. (d)  
 12. (a) 13. (d) 14. (d) 15. (c) 16. (c) 17. (a)  
 18. (d) 19. (d) 20. (c) 21. (d) 22. (c) 23. (b) 24. (c) 25. (d)  
 26. (b) 27. (a)

**True / False Questions**

1. A statistic is a characteristic of a population.
2. A parameter is a characteristic of a population.
3. Discrete data are data values that are measured over a continuous interval.
4. Continuous data are data that are measured over a given interval.
5. The amount of rainfall in your state for the last month is an example of discrete data.
6. The number of days it rained where you live during the last month is an example of discrete data.
7. Statistics is the science of collecting, classifying, presenting, and interpreting numerical data.
8. The subject of statistics can be broadly divided into two areas: descriptive statistics and inferential statistics.
9. A sample is the set of all possible data values for a given subject under consideration.
10. Descriptive statistics involves the collection, organization, and analysis of all data relating to some population or sample under study.
11. Statistics is concerned only with the collection, organization, display, and analysis of data.
12. A population is the set of all possible values for a given subject under consideration.
13. Inferential statistics involves making predictions or decisions about a sample from a population of values.
14. The frequency of a measurement is the number of times that measurement was observed.
15. The lower class limit for a given class is the smallest possible data value for that class.
16. The class mark for a class is the average of the upper and lower class limits for the given class.
17. The cumulative frequency of a class is the total of all class frequencies up to but not including the frequency of the present class.
18. The relative frequency for a given class is the total of all class frequencies before the class divided by the total number of entries.

19. The class midpoint for a class is computed from  $(\text{upper limit} - \text{lower limit})/2$ , where the upper and lower limits are for the given class.
20. A frequency histogram and a relative frequency histogram for the same (grouped) frequency distribution will always have the same shape.
21. A frequency polygon for a set of data is obtained by connecting the class marks on the histogram displaying the set of data.
22. The choice of a single item from a group is called random if every item in the group has the same chance of being selected as every other item.
23. The class mark of a class is the midpoint between the lower limit of one class and the upper limit of the next class.
24. A population is part of a sample.
25. In stem-and-leaf displays, the trailing digits (digits to the right) are called the leaves.
26. The sum of the relative frequencies in a relative frequency distribution should always equal 1.
27. A population refers to the entire set of data values for a subject under consideration; a sample is a subset of the population.
28. A census is a sample of the entire population.

#### True/False Questions

1. The mean of a set of data always divides the data set such that 50 percent of the values lie above the mean and 50 percent lie below the mean.
2. The mode is a measure of variability.
3. The median of a set of data values is that value that occurs the most.
4. The mean is not equal to the median in a symmetrical distribution.
5. Of the mean, the median, and the mode of a data set, the mean is most influenced by an outlying value in the data set.
6. If the number of observations in a data set is odd, the median cannot be accurately found, but rather is approximated.
7. A data set with more than one mode is said to be bimodal.
8. The sum of the deviations from the mean for any data set is always 0.
9. For a negatively skewed distribution, the tail is to the right of the mean.

10. For a positively skewed distribution, the mode is less than the median, and the median is less than the mean.

**True/False Questions**

1. The mean absolute deviation of a set of data always divides the data set in such a way that 50 percent of the values lie above the mean and 50 percent lie below the mean.
2. The median is a measure of variability.
3. The range of a set of data values is the largest value in the data set.
4. If the standard deviation is large, the data are less dispersed.
5. The standard deviation of a data set can be positive or negative.
6. Of a set of data values, 50 percent lie within one standard deviation of the mean of the data set.
7. In an ordered data set, the median of the upper 50 percent of the data set corresponds to a numerical value such that 75 percent of the values are below it.

**Data**

8. The sum of the absolute deviations from the mean of a data set is always equal to 0.
9. The Empirical Rule states that exactly 95 percent of a data set would lie within two standard deviations of the mean.
10. The unit for the variance of a data set is the square of the unit for the variable associated with the data set.
11. The interquartile range is the average of the medians of the lower and upper 50 percent of an ordered data set.
12. The standard deviation is the square of the variance.
13. The mean absolute deviation is a measure of variability.
14. On a statistics exam, Joe's score was at the median for the lower 50 percent of the scores, and John's score was at the median of the upper 50 percent of the scores. Thus, we can say that John's score was twice Joe's score.
15. The mean value of a data set corresponds to half the value of the range.
16. Of the range, the interquartile range, and the variance of a data set, the interquartile range is most influenced by an outlying value in the data set.
17. Fifty percent of an ordered set of data values constitutes the interquartile range.
18. Quantities that describe populations are called parameters, and quantities that describe samples are called statistics.



19. For a bell-shaped distribution, the range of the values is approximately equal to the length of values within three standard deviations of the mean.
20. The coefficient of variation can be used to compare the variability of data sets that have different units.
21. A data set can have more than one measure of variability.
22. The Empirical Rule applies to all sets of data.
23. The value of the mean absolute deviation represents the number of standard deviations above or below the mean of the data set.
24. The sum of the absolute deviations from the mean for any data set may equal 0.
25. The range is not influenced by an outlying value in a data set.

#### ANSWER KEY

##### True/False Questions

1. F 2. T 3. F 4. T 5. F 6. T 7. T 8. T 9. F 10. T 11. F  
12. T 13. F 14. T 15. T 16. T 17. F 18. F 19. F 20. T 21. T  
22. T 23. F 24. F 25. T 26. T 27. T 28. T

##### True/False Questions

1. F 2. F 3. F 4. F 5. T 6. F 7. F 8. T 9. F 10. T

##### True/False Questions

1. F 2. F 3. F 4. F 5. F 6. F 7. T 8. F 9. F 10. T 11. F  
12. F 13. T 14. F 15. F 16. F 17. T 18. T 19. T 20. T 21. T  
22. F 23. F 24. T 25. F

### Completion Questions

1. A (parameter, statistic) is a characteristic of a population
2. A (parameter, statistic) is a characteristic of a sample.
3. A sample of the entire population is called a (sample, population, census)
4. Data that are counting numbers are called (discrete, continuous) data
5. Data that are measured over an interval are called (discrete, continuous) data.
6. Drawing conclusions about a population from a sample is classified as (descriptive, inferential) statistics.
7. (Descriptive, Inferential) statistics is concerned with making predictions about an entire population based on information from a sample that was appropriately chosen from the population
8. (Descriptive, Inferential) statistics involves the collection, organization, summarization, and presentation of data.
9. A set of all possible data values for a subject under consideration is called a (sample, population)
10. Class marks are the (lower limits, midpoints, upper limits) of each class.
11. A subset of a population is called a (census, sample, small population)
12. The lower class limit is the (smallest, largest) possible data value for a class.
13. The (relative frequency, frequency, cumulative frequency) is the number of occurrences of a measurement or data value.
14. The shape of the frequency distribution and the relative frequency distribution will always be (the same, different, skewed)
15. Name three graphical methods by which you can display a set of data: (a) (b) ; (c)
16. The (relative, cumulative) frequency of a class is the total of all class frequencies up to and including the present class
17. Data such as sex, eye color, race, etc., are classified as (quantitative, qualitative) data.
18. The class mark of a class is defined to be the (average, minimum, maximum) of the upper and lower limits of the class.
19. In a histogram there are no (gaps, values) between the classes represented.
20. A pie chart or circle graph can be used to display (qualitative, quantitative, both types of) data.

21. In a stem-and-leaf plot, the trailing digits are called the (leaves, stems) of the plot and the leading digits are called the (leaves, stems) of the plot.
22. The choice of a single item from a group is called (random, biased) if every item from a group has the same chance of being selected as every other item.

### Completion Questions

1. If the number of measurements in a data set is odd, the median is the value when the data set is ordered from the smallest value to the largest value.
2. If the number of measurements in a data set is even, the median is the of the two values when the data set is ordered from the smallest value to the largest value.
3. The (mean, median, mode) for a set of data is the value in the data set that occurs most frequently.
4. Two measures of central tendency are the and the
5. For a symmetrical distribution, the mean, mode, and median are all (equal to, different from) one another.
6. For a negatively skewed distribution, the mean is (smaller, greater) than the median and the mode.
7. For a positively skewed distribution, the tail of the distribution is to the (right, left) of the distribution.
8. For a positively skewed distribution, the median is (smaller, larger) than the mode.

### Completion Questions

1. The range of a set of data values is the difference between the (largest, smallest) value and the (largest, smallest) value.
2. The mean absolute deviation will always be a (positive, negative) number.
3. The sum of the deviations from the mean in a data set will always be (negative, positive, zero)
4. The coefficient of variation can be used to compare the (centralness, variability) of data sets.
5. The interquartile range is the middle (25, 50, 75) percent of the ordered data values.
6. The smaller the value of the standard deviation of a data set, the smaller the amount of

(range, variability, MAD) in the data set.

7. According to the Empirical Rule, approximately (68,95,99.7) percent of the values in a data set will lie within three standard deviations of the (mean, median, mode) if the data set is bell-shaped.
8. The standard deviation of a data set has the same as the variable from which the data was obtained.
9. The mean absolute deviation for a data set measures the (average, median) distance of the values in the set from the mean.
10. It is preferred to use the rather than the variance because it has the same unit as the variable for the data.
11. Two measures of variability are the and the
12. When computing the mean absolute deviation and the variance, measurements are deviated from the (mean, median, standard deviation) in the computations.
13. If two sets of data values are compared, the larger indicates a larger dispersion about the
14. If a measurement in a data set is below the mean value for that set, then the deviation from the mean will be (positive, negative)
15. For a bell curve distribution, approximately (68, 95, 99.7) percent of the data values will lie within one standard deviation of the mean.

### ANSWER KEY

#### Completion Questions

1. parameter 2. statistic 3. census 4. discrete 5. continuous 6. inferential
7. Inferential 8. Descriptive 9. population 10. midpoints 11. sample
12. smallest 13. frequency 14. the same 15. bar chart, histogram, pie chart, frequency polygon, stem-and-leaf plot (any three) 16. cumulative 17. qualitative
18. average 19. gaps 20. both types of 21. leaves, stems 22. random

#### Completion Questions

1. middle 2. average, middle 3. mode 4. mean, median, mode (any two)
5. equal to 6. smaller 7. right 8. larger

### Completion Questions

1. largest, smallest 2. positive 3. zero 4. variability 5. 50 6. variability 7. 99.7, mean 8. unit 9. average 10. standard deviation 11. range, interquartile range, mean absolute deviation, variance, standard deviation, coefficient of variation (any two) 12. mean 13. variance or coefficient of variation, mean 14. negative 15. 68

### Further Exercises

If possible, you can use any technology available to help you solve the following questions.

1. The at-rest pulse rates for 16 athletes at a meet are

67 57 56 57 58 56 54 64 53 54 54 55 57 68 60 58

Find the median, mode, and mean for this set of data.

2. The speeds (in mph) of 16 cars on a highway were observed to be

58 56 60 57 52 54 54 59 63 54 53 54 58 56 57 67

Find the mean, mode, and median for this set of data.

3. Estimate the mean for the following frequency distribution. Hint: Use the class marks as the actual observed values in each class

CLASS	FREQUENCY
10-15	2
15-20	4
20-25	4
25-30	3
30-35.	2

4. Find the mean, median, and mode for the following examination scores

#### Exam Scores

4|568

5|34569

6|2356699

7|01133455578

8|12369

9|3578

5. The following frequency distribution shows the scores on the exit examination for statistics majors at a four-year college for a given year.

98 75 85 97 80 87 97 60 83 90

Find the mean, mode, and median for this set of data.

6. The starting incomes for mathematics majors at a particular university were recorded for five years and are summarized in the following table

STARTING SALARY IN \$1000	FREQUENCY
10-15	3
15-20	5
20-25	10
25-30	7
30-35	1

(a) Construct a histogram for the data.

(b) Compute an approximate value for the mean by using the class mark values.

7. The numbers of 30-second radio advertising spots purchased by each of the 25 members of a local restaurant association last year are given below:

**Numbers of 30-Second Spots**

1 1 1 1 2 3 3 3 4 5 6 7

2 1 3 4 4 5 6 6

3 1 1 1 2 2 2 3

4 1 0 0 1

(a) Find the median.

(b) Find the mode.

(c) Find the mean.

(d) Describe the shape of the distribution.

(e) Construct a histogram for the data set.

If possible, you can use any technology available to help you solve the following questions.

1. The at-rest pulse rates for 16 athletes at a meet are

67 57 56 57 58 56 54 64 53 54 54 55 57 68 60 58

Find the range, interquartile range, mean absolute deviation, variance, standard deviation, and coefficient of variation for this set of data

2. The speeds (in mph) of 16 cars on a highway were observed to be

58 56 60 57 52 54 54 59 63 54 53 54 58 56 57 67

Find the range, interquartile range, mean absolute deviation, variance, standard deviation, and coefficient of variation for this set of data.

3. *Estimate* the range, interquartile range, mean absolute deviation, variance, standard deviation, and coefficient of variation for the following frequency distribution.

Recall

that you can use the class marks for the intervals to approximate the observed values in the distribution

CLASS	FREQUENCY
10-15	2
15-20	4
20-25	4
25-30	3
30-35	2

4. Find the range, interquartile range, mean absolute deviation, variance, standard deviation, and coefficient of variation for the following examination scores.

**Exam Scores**

4 | 568

5 | 34569

6 | 2356699

7 | 01133455578

8 | 12369

9 | 3578

5. The following frequency distribution shows the scores for the exit examination for statistics majors at a four-year college for a given year.

98 75 85 97 80 87 97 60 83 90

Find the range, interquartile range, mean absolute deviation, variance, standard deviation, and coefficient of variation for this set of data.

6. The starting incomes for mathematics majors at a particular university were recorded for five years and are summarized in the following table:

**STARTING SALARY (IN \$1000)**

**FREQUENCY**

10-15	3
15-20	5
20-35	10
25-30	7
30-35	1

*Estimate* the range, interquartile range, mean absolute deviation, variance, standard deviation, and coefficient of variation for this frequency distribution. Recall that you can use the class marks for the intervals to approximate the observed values in the distribution

7. The numbers of minutes spent in the computer lab by 20 students working on a project are given below:

**Numbers of Minutes**

30 | 0,2,5,5,6,6,8

40 | 0, 2, 2,5,7,9

50 | 0, 1,3,5

60 | 1,3

Find the range, interquartile range, mean absolute deviation, variance, standard deviation, and coefficient of variation for this set of data.

8. The following frequency distribution shows the distances traveled to campus (in miles) by 30 commuter students

DISTANCE (IN MILES)	FREQUENCY
35-40	8
40-45	13
45-50	6
50-55	3

Estimate the range, interquartile range, mean absolute deviation, variance, standard deviation, and coefficient of variation for this frequency distribution. Recall that you can use the class marks for the intervals to approximate the observed values in the distribution.

**Further Exercise**

If possible, you can use any technology available to help you solve the following questions.

1. The at-rest pulse rates for 16 athletes at a meet are

67 57 56 57 58 56 54 64 53 54 54 55 57 68 60 58

- (a) Construct a relative frequency distribution for this data set using classes 50-55, 55-60, . . . .



(b) Construct a histogram for this set of data using the distribution in part (a).

2. The speeds (in mph) of 16 cars on a highway were observed to be

58 56 60 57 52 54 54 59 63 54 53 54 58 56 57 67

(a) Construct a relative frequency distribution for this data set using classes 52-55.

55-58, . . . .

(b) Construct a stem-and-leaf plot for the data set

3. The starting incomes for mathematics majors at a particular university were recorded for five years and are summarized in the following table:

STARTING SALARY IN \$1000	FREQUENCY
10-15	3
15-20	5
20-25	10
25-30	7
30-35	1

(a) Construct a histogram for the data.

(b) Construct a table with the relative frequencies and the cumulative relative frequencies.

4. The following frequency distribution shows the distances to campus (in miles) traveled by 30 commuter students:

DISTANCE IN MILES\	FREQUENCY
35-40	8
40-45	13
45-50	6
50-55	3

For the class 40-45, find the following:

(a) Lower class limit

- (b) Upper class limit
- (c) Class width
- (d) Class mark
- (e) Cumulative frequency
- (f) Relative frequency
- (g) Cumulative relative frequency