

CHAPTER 2

CHARTS AND GRAPHS

CHAPTER LEARNING OBJECTIVES

1. Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

The two types of data are grouped and ungrouped. Grouped data are data organized into a frequency distribution. Differentiating between grouped and ungrouped data is important, because statistical operations on the two types are computed differently. Constructing a frequency distribution involves several steps. The first step is to determine the range of the data, which is the difference between the largest value and the smallest value. Next, the number of classes is determined, which is an arbitrary choice of the researcher. However, too few classes overaggregate the data into meaningless categories, and too many classes do not summarize the data enough to be useful. The third step in constructing the frequency distribution is to determine the width of the class interval. Dividing the range of values by the number of classes yields the approximate width of the class interval.

The class midpoint is the midpoint of a class interval. It is the average of the class endpoints and represents the halfway point of the class interval. Relative frequency is computed by dividing an individual frequency by the sum of the frequencies. Relative frequency represents the proportion of total values that is in a given class interval. The cumulative frequency is a running total frequency tally that starts with the first frequency value and adds each ensuing frequency to the total.

2. Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Two types of graphical depictions are quantitative data graphs and qualitative data graphs. Quantitative data graphs presented in this chapter are histogram, frequency polygon, ogive, and stem and leaf plot. Qualitative data graphs presented are pie chart, bar chart, and Pareto chart. In addition, two-dimensional scatter plots are presented. A histogram is a vertical bar chart in which a line segment connects class endpoints at the value of the frequency. Two vertical lines connect this line segment down to the x-axis, forming a rectangle. A frequency polygon is constructed by plotting a dot at the midpoint of each class interval for the value of each frequency and then connecting the dots. Ogives are cumulative frequency polygons. Points on an ogive are plotted at the class endpoints. Stem and leaf plots are another way to organize data. The numbers are divided into two parts, a stem and a leaf. The stems are the left-most digits of the numbers and the leaves are the right-most digits. The stems are listed individually, with all leaf values corresponding to each stem displayed beside that stem.

3. Describe and construct different types of qualitative data graphs, including pie charts, bar charts, and Pareto charts. Explain when these graphs should be used. A pie chart is a circular depiction of data. The amount of each category is represented as a slice of the pie proportionate to the total. The researcher is cautioned in using pie charts because it is sometimes difficult to differentiate the relative sizes of the slices. The bar chart or bar graph

uses bars to represent the frequencies of various qualitative categories. The bar chart can be displayed horizontally or vertically. A Pareto chart is a vertical bar chart that is used in total quality management to graphically display the causes of problems. The Pareto chart presents problem causes in descending order to assist the decision maker in prioritizing problem causes.

4. Display and analyze two variables simultaneously using cross tabulation and scatter plots. Cross tabulation is a process for producing a two-dimensional table that displays the frequency counts for two variables simultaneously. The scatter plot is a two-dimensional plot of pairs of points from two numerical variables. It is used to graphically determine whether any apparent relationship exists between the two variables.

TRUE-FALSE STATEMENTS

1. A summary of data in which raw data are grouped into different intervals and the number of items in each group is listed is called a frequency distribution.

Answer: True

Difficulty: Easy

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

2. If the individual class frequency is divided by the total frequency, the result is the median frequency.

Answer: False

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

3. For any given data set, a frequency distribution with a larger number of classes will always be better than the one with a smaller number of classes.

Answer: False

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

4. One rule that must always be followed in constructing frequency distributions is that the adjacent classes must overlap.

Answer: False

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

5. A cumulative frequency distribution provides a running total of the frequencies in the classes.

Answer: True

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

6. The difference between the highest number and the lowest number in a set of data is called the differential frequency.

Answer: False

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

7. A graphical representation of a frequency distribution is called a pie chart.

Answer: False

Difficulty: Easy

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

8. A cumulative frequency polygon is also called an ogive.

Answer: True

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

9. A histogram can be described as a type of vertical bar chart.

Answer: True

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

10. One advantage of a stem and leaf plot over a frequency distribution is that the values of the original data are retained.

Answer: True

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

11. For a company in gardening supplies business, the best graphical way to show the percentage of a total budget that is spent on each of a number of different expense categories is the stem and leaf plot.

Answer: False

Difficulty: Hard

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

12. In a histogram, the tallest bar represents the class with the highest cumulative frequency.

Answer: False

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

13. A scatter plot shows how the numbers in a data set are scattered around their average.

Answer: False

Difficulty: Medium

Learning Objective: Describe and construct different types of qualitative data graphs, including pie charts, bar charts, and Pareto charts. Explain when these graphs should be used.

Section Reference: 2.3 Qualitative Data Graphs

14. A scatter plot is a two-dimensional graph plot of data containing pairs of observations on two numerical variables.

Answer: True

Difficulty: Medium

Learning Objective: Describe and construct different types of qualitative data graphs, including pie charts, bar charts, and Pareto charts. Explain when these graphs should be used.

Section Reference: 2.3 Qualitative Data Graphs

15. A scatter plot is useful for examining the relationship between two numerical variables.

Answer: True

Difficulty: Medium

Learning Objective: Describe and construct different types of qualitative data graphs, including pie charts, bar charts, and Pareto charts. Explain when these graphs should be used.

Section Reference: 2.3 Qualitative Data Graphs

MULTIPLE CHOICE QUESTIONS

16. Consider the following frequency distribution:

<u>Class Interval</u>	<u>Frequency</u>
10–under 20	15
20–under 30	25
30–under 40	10

What is the midpoint of the first class?

- a) 10
- b) 20
- c) 15
- d) 30
- e) 40

Answer: c

Difficulty: Easy

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

17. Consider the following frequency distribution:

<u>Class Interval</u>	<u>Frequency</u>
10–under 20	15
20–under 30	25
30–under 40	10

What is the relative frequency of the first class?

- a) 0.15
- b) 0.30
- c) 0.10
- d) 0.20
- e) 0.40

Answer: b

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

18. Consider the following frequency distribution:

<u>Class Interval</u>	<u>Frequency</u>
10–under 20	15
20–under 30	25
30–under 40	10

What is the cumulative frequency of the second class interval?

- a) 25

- b) 40
- c) 15
- d) 50

Answer: b

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

19. The number of phone calls arriving at a switchboard each hour has been recorded, and the following frequency distribution has been developed:

<u>Class Interval</u>	<u>Frequency</u>
20–under 40	30
40–under 60	45
60–under 80	80
80–under 100	45

What is the midpoint of the last class?

- a) 80
- b) 100
- c) 95
- d) 90
- e) 85

Answer: d

Difficulty: Easy

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

20. The number of phone calls arriving at a switchboard each hour has been recorded, and the following frequency distribution has been developed:

<u>Class Interval</u>	<u>Frequency</u>
20–under 40	30
40–under 60	45
60–under 80	80
80–under 100	45

What is the relative frequency of the second class?

- a) 0.455
- b) 0.900
- c) 0.225
- d) 0.750
- e) 0.725

Answer: c

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

21. The number of phone calls arriving at a switchboard each hour has been recorded, and the following frequency distribution has been developed:

<u>Class Interval</u>	<u>Frequency</u>
20–under 40	30
40–under 60	45
60–under 80	80
80–under 100	45

What is the cumulative frequency of the third class?

- a) 80
- b) 0.40
- c) 155
- d) 75
- e) 105

Answer: c

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

22. A person has decided to construct a frequency distribution for a set of data containing 60 numbers. The lowest number is 23 and the highest number is 68. If 5 classes are used, the class width should be approximately ____.

- a) 4
- b) 12
- c) 8
- d) 5
- e) 9

Answer: e

Difficulty: Easy

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

23. A person has decided to construct a frequency distribution for a set of data containing 60 numbers. The lowest number is 23 and the highest number is 68. If 7 classes are used, the class width should be approximately ____.

- a) 5
- b) 7
- c) 9
- d) 11

e) 12

Answer: b

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

24. A frequency distribution was developed. The lower endpoint of the first class is 9.30, and the midpoint is 9.35. What is the upper endpoint of this class?

- a) 9.50
- b) 9.60
- c) 9.70
- d) 9.40
- e) 9.80

Answer: d

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

25. The cumulative frequency for a class is 27. The cumulative frequency for the next (non-empty) class will be ____.

- a) less than 27
- b) equal to 27
- c) next class frequency minus 27
- d) 27 minus the next class frequency
- e) 27 plus the next class frequency

Answer: e

Difficulty: Hard

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

26. The following class intervals for a frequency distribution were developed to provide information regarding the starting salaries for students graduating from a particular school:

<u>Salary</u> (\$1,000s)	<u>Number of Graduates</u>
18–under 21	-
21–under 25	-
24–under 27	-
29–under 30	-

Before data was collected, someone questioned the validity of this arrangement. Which of the

following represents a problem with this set of intervals?

- a) There are too many intervals.
- b) The class widths are too small.
- c) Some numbers between 18,000 and 30,000 would fall into two different intervals.
- d) The first and the second interval overlap.
- e) There are too few intervals.

Answer: c

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

27. The following class intervals for a frequency distribution were developed to provide information regarding the starting salaries for students graduating from a particular school:

<u>Salary</u> (\$1,000s)	<u>Number of Graduates</u>
18–under 21	-
21–under 25	-
24–under 27	-
29–under 30	-

Before data was collected, someone questioned the validity of this arrangement. Which of the following represents a problem with this set of intervals?

- a) There are too many intervals.
- b) The class widths are too small.
- c) Some numbers between 18,000 and 30,000 would not fall into any of these intervals.
- d) The first and the second interval overlap.
- e) There are too few intervals.

Answer: c

Difficulty: Hard

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

28. The following class intervals for a frequency distribution were developed to provide information regarding the starting salaries for students graduating from a particular school:

<u>Salary</u> (\$1,000s)	<u>Number of Graduates</u>
18–under 21	-
21–under 25	-
24–under 27	-
29–under 30	-

Before data was collected, someone questioned the validity of this arrangement. Which of the following represents a problem with this set of intervals?

- a) There are too many intervals.
- b) The class widths are too small.

- c) The class widths are too large.
- d) The second and the third interval overlap.
- e) There are too few intervals.

Answer: d

Difficulty: Hard

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

29. Abel Alonzo, Director of Human Resources, is exploring employee absenteeism at the Harrison Haulers Plant during the last operating year. A review of all personnel records indicated that absences ranged from zero to twenty-nine days per employee. The following class intervals were proposed for a frequency distribution of absences:

<u>Absences</u> (Days)	<u>Number of Employees</u>
0–under 5	-
5–under 10	-
10–under 15	-
20–under 25	-
25–under 30	-

Which of the following represents a problem with this set of intervals?

- a) There are too few intervals.
- b) Some numbers between 0 and 29, inclusively, would not fall into any interval.
- c) The first and second interval overlaps.
- d) There are too many intervals.
- e) The second and the third interval overlap.

Answer: b

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

30. Abel Alonzo, Director of Human Resources, is exploring employee absenteeism at the Harrison Haulers Plant during the last operating year. A review of all personnel records indicated that absences ranged from zero to twenty-nine days per employee. The following class intervals were proposed for a frequency distribution of absences:

<u>Absences</u> (Days)	<u>Number of Employees</u>
0–under 10	-
10–under 20	-
20–under 30	-

Which of the following might represent a problem with this set of intervals?

- a) There are too few intervals.
- b) Some numbers between 0 and 29 would not fall into any interval.
- c) The first and second interval overlaps.

- d) There are too many intervals.
- e) The second and the third interval overlap.

Answer: a

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

31. Consider the relative frequency distribution given below:

<u>Class Interval</u>	<u>Relative Frequency</u>
20–under 40	0.2
40–under 60	0.3
60–under 80	0.4
80–under 100	0.1

There were 60 numbers in the data set. How many numbers were in the interval 20–under 40?

- a) 12
- b) 20
- c) 40
- d) 10
- e) 15

Answer: a

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

32. Consider the relative frequency distribution given below:

<u>Class Interval</u>	<u>Relative Frequency</u>
20–under 40	0.2
40–under 60	0.3
60–under 80	0.4
80–under 100	0.1

There were 60 numbers in the data set. How many numbers were in the interval 40–under 60?

- a) 30
- b) 50
- c) 18
- d) 12
- e) 15

Answer: c

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

33. Consider the relative frequency distribution given below:

<u>Class Interval</u>	<u>Relative Frequency</u>
20–under 40	0.2
40–under 60	0.3
60–under 80	0.4
80–under 100	0.1

There were 60 numbers in the data set. How many of the number were less than 80?

- a) 90
- b) 80
- c) 0.9
- d) 54
- e) 100

Answer: d

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

34. Consider the following frequency distribution:

<u>Class Interval</u>	<u>Frequency</u>
100–under 200	25
200–under 300	45
300–under 400	30

What is the midpoint of the first class?

- a) 100
- b) 150
- c) 25
- d) 250
- e) 200

Answer: b

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

35. Consider the following frequency distribution:

<u>Class Interval</u>	<u>Frequency</u>
100–under 200	25
200–under 300	45
300–under 400	30

What is the relative frequency of the second class interval?

- a) 0.45
- b) 0.70

- c) 0.30
- d) 0.33
- e) 0.50

Answer: a

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

36. Consider the following frequency distribution:

<u>Class Interval</u>	<u>Frequency</u>
100–under 200	25
200–under 300	45
300–under 400	30

What is the cumulative frequency of the second class interval?

- a) 25
- b) 45
- c) 70
- d) 100
- e) 250

Answer: c

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

37. Consider the following frequency distribution:

<u>Class Interval</u>	<u>Frequency</u>
100–under 200	25
200–under 300	45
300–under 400	30

What is the midpoint of the last class interval?

- a) 15
- b) 350
- c) 300
- d) 200
- e) 400

Answer: b

Difficulty: Medium

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

38. Pinky Bauer, Chief Financial Officer of Harrison Haulers, Inc., suspects irregularities in the payroll system, and orders an inspection of "each and every payroll voucher issued since January 1, 2000." Each payroll voucher was inspected and the following frequency distribution was compiled.

<u>Errors per Voucher</u>	<u>Number of Vouchers</u>
0–under 2	500
2–under 4	400
4–under 6	300
6–under 8	200
8–under 10	100

The relative frequency of the first class interval is ____.

- a) 0.50
- b) 0.33
- c) 0.40
- d) 0.27
- e) 0.67

Answer: b

Difficulty: Hard

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

39. Pinky Bauer, Chief Financial Officer of Harrison Haulers, Inc., suspects irregularities in the payroll system, and orders an inspection of "each and every payroll voucher issued since January 1, 2000." Each payroll voucher was inspected and the following frequency distribution was compiled.

<u>Errors per Voucher</u>	<u>Number of Vouchers</u>
0–under 2	500
2–under 4	400
4–under 6	300
6–under 8	200
8–under 10	100

The cumulative frequency of the second class interval is ____.

- a) 1,500
- b) 500
- c) 900
- d) 1,000
- e) 1,200

Answer: c

Difficulty: Hard

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

40. Pinky Bauer, Chief Financial Officer of Harrison Haulers, Inc., suspects irregularities in the payroll system, and orders an inspection of "each and every payroll voucher issued since January 1, 2000." Each payroll voucher was inspected and the following frequency distribution was compiled.

<u>Errors per Voucher</u>	<u>Number of Vouchers</u>
0–under 2	500
2–under 4	400
4–under 6	300
6–under 8	200
8–under 10	100

The midpoint of the first class interval is ____.

- a) 500
- b) 2
- c) 1.5
- d) 1
- e) 250

Answer: d

Difficulty: Hard

Learning Objective: Explain the difference between grouped and ungrouped data and construct a frequency distribution from a set of data and explain what the distribution represents.

Section Reference: 2.1 Frequency Distributions

41. Consider the following stem and leaf plot:

<u>Stem</u>	<u>Leaf</u>
1	0, 2, 5, 7
2	2, 3, 4, 4
3	0, 4, 6, 6, 9
4	5, 8, 8, 9
5	2, 7, 8

Suppose that a frequency distribution was developed from this, and there were 5 classes (10–under 20, 20–under 30, etc.). What would the frequency be for class 30–under 40?

- a) 3
- b) 4
- c) 6
- d) 7
- e) 5

Answer: e

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

42. Consider the following stem and leaf plot:

<u>Stem</u>	<u>Leaf</u>
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1	0, 2, 5, 7
2	2, 3, 4, 8
3	0, 4, 6, 6, 9
4	5, 8, 8, 9
5	2, 7, 8

Suppose that a frequency distribution was developed from this, and there were 5 classes (10–under 20, 20–under 30, etc.). What would be the relative frequency of the class 20–under 30?

- a) 0.4
- b) 0.25
- c) 0.20
- d) 4
- e) 0.50

Answer: c

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

43. Consider the following stem and leaf plot:

<u>Stem</u>	<u>Leaf</u>
1	0, 2, 5, 7
2	2, 3, 4, 8
3	0, 4, 6, 6, 9
4	5, 8, 8, 9
5	2, 7, 8

Suppose that a frequency distribution was developed from this, and there were 5 classes (10–under 20, 20–under 30, etc.). What was the highest number in the data set?

- a) 50
- b) 58
- c) 59
- d) 78
- e) 98

Answer: b

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

44. Consider the following stem and leaf plot:

<u>Stem</u>	<u>Leaf</u>
1	0, 2, 5, 7
2	2, 3, 4, 8
3	0, 4, 6, 6, 9

4	5, 8, 8, 9
5	2, 7, 8

Suppose that a frequency distribution was developed from this, and there were 5 classes (10–under 20, 20–under 30, etc.). What was the lowest number in the data set?

- a) 0
- b) 10
- c) 7
- d) 2
- e) 1

Answer: b

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

45. Consider the following stem and leaf plot:

<u>Stem</u>	<u>Leaf</u>
1	0, 2, 5, 7
2	2, 3, 4, 8
3	0, 4, 6, 6, 9
4	5, 8, 8, 9
5	2, 7, 8

Suppose that a frequency distribution was developed from this, and there were 5 classes (10–under 20, 20–under 30, etc.). What is the cumulative frequency for the 30–under 40 class interval?

- a) 5
- b) 9
- c) 13
- d) 14
- e) 18

Answer: c

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

46. An instructor has decided to graphically represent the grades on a test. The instructor uses a plus/minus grading system (i.e., she gives grades of A-, B+, etc.). Which of the following would provide the most information for the students?

- a) a histogram
- b) a stem and leaf plot
- c) a cumulative frequency distribution
- d) a frequency distribution

e) a scatter plot

Answer: b

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

47. The following represent the ages of students in a class:

19, 23, 21, 19, 19, 20, 22, 31, 21, 20

If a stem and leaf plot were to be developed from this, how many stems would there be?

- a) 2
- b) 3
- c) 4
- d) 5
- e) 10

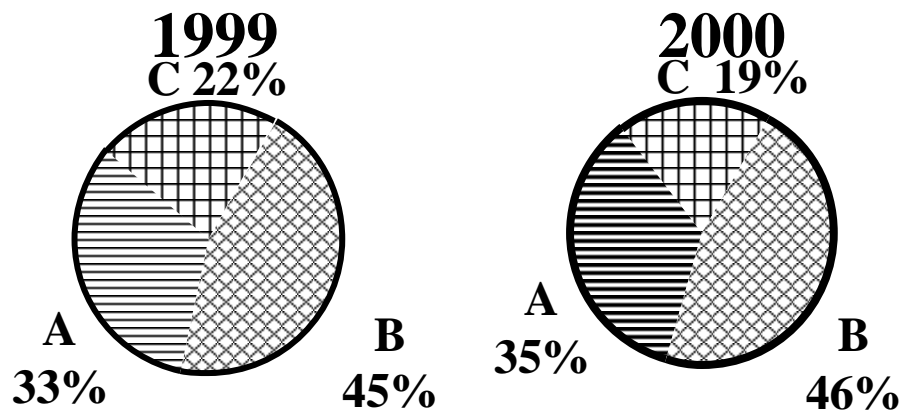
Answer: b

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

48. The 1999 and 2000 market share data of the three competitors (A, B, and C) in an oligopolistic industry are presented in the following pie charts:



Which of the following is true?

- a) Only company B gained market share.
- b) Only company C lost market share.
- c) Company A lost market share.
- d) Company B lost market share.

e) All companies lost market share.

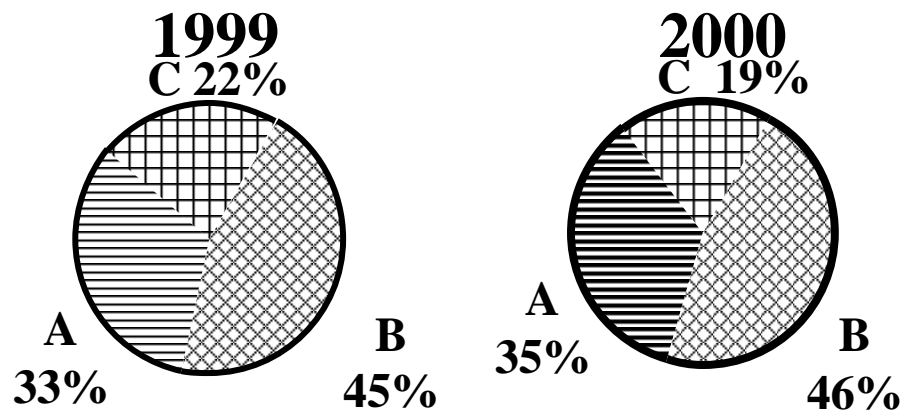
Answer: b

Difficulty: Hard

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

49. The 1999 and 2000 market share data of the three competitors (A, B, and C) in an oligopolistic industry are presented in the following pie charts. Total sales for this industry were \$1.5 billion in 1999 and \$1.8 billion in 2000. Company C's sales in 2000 were ____.



- a) \$342 million
- b) \$630 million
- c) \$675 million
- d) \$828 million
- e) \$928 million

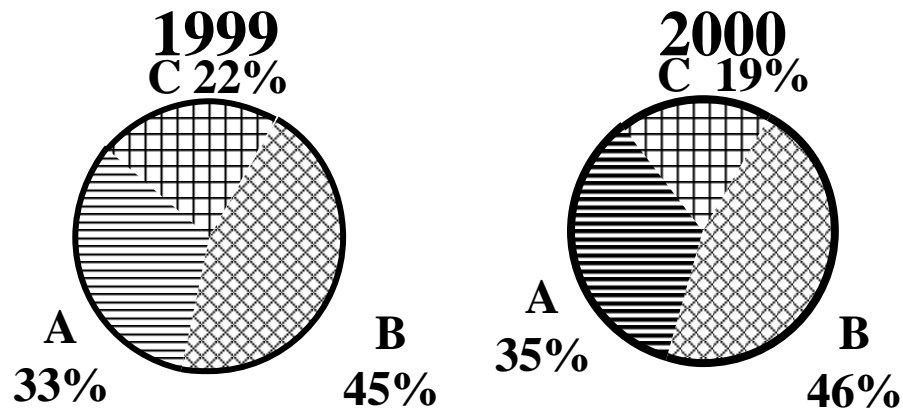
Answer: a

Difficulty: Hard

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

50. The 1999 and 2000 market share data of the three competitors (A, B, and C) in an oligopolistic industry are presented in the following pie charts. Total sales for this industry were \$1.5 billion in 1999 and \$1.8 billion in 2000.



Company B's sales in 1999 were ____.

- a) \$342 million
- b) \$630 million
- c) \$675 million
- d) \$828 million
- e) \$928 million

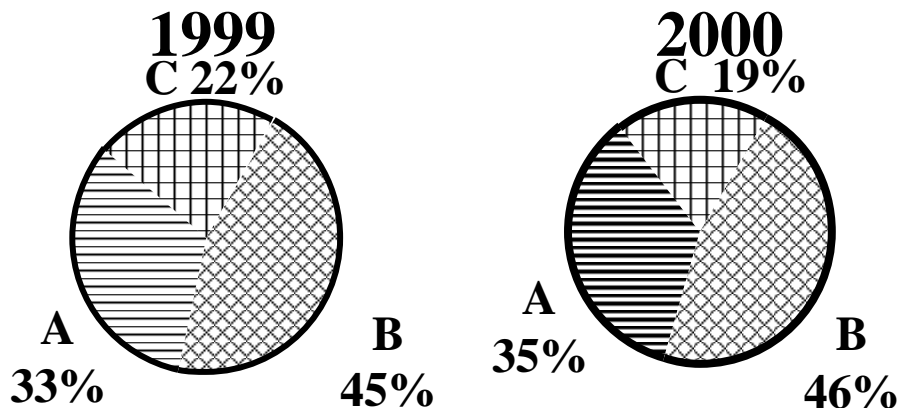
Answer: c

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

51. The 1999 and 2000 market share data of the three competitors (A, B, and C) in an oligopolistic industry are presented in the following pie charts:



Which of the following may be a false statement?

- a) Sales revenues declined at company C.
- b) Only company C lost market share.
- c) Company A gained market share.
- d) Company B gained market share.
- e) Both Company A and Company B gained market share.

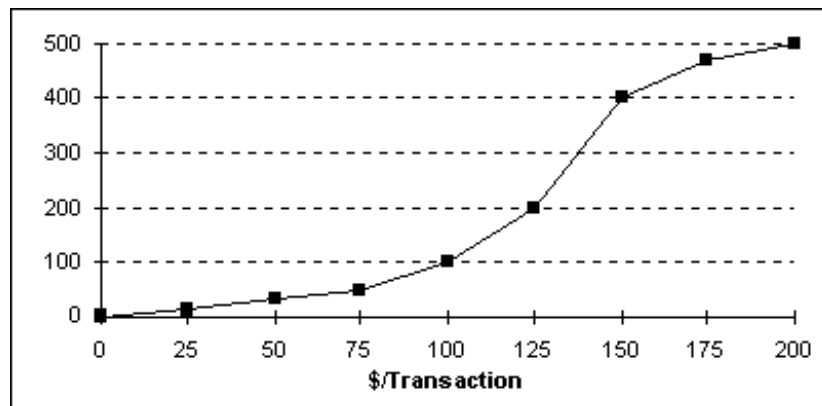
Answer: a

Difficulty: Hard

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

52. Each day, the office staff at Oasis Quick Shop prepares a frequency distribution and an ogive of sales transactions by dollar value of the transactions. Saturday's cumulative frequency ogive follows:



The total number of sales transactions on Saturday was ____.

- a) 200
- b) 500
- c) 300
- d) 100
- e) 400

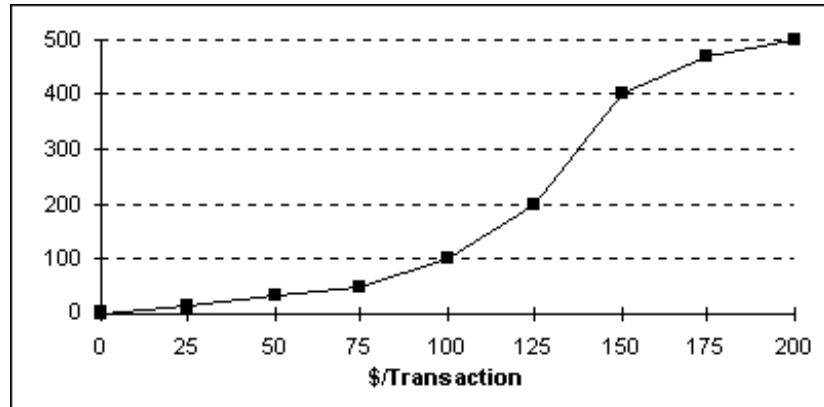
Answer: b

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

53. Each day, the office staff at Oasis Quick Shop prepares a frequency distribution and an ogive of sales transactions by dollar value of the transactions. Saturday's cumulative frequency ogive follows:



The percentage of sales transactions on Saturday that were under \$100 each was ____.

- a) 100
- b) 10
- c) 80
- d) 20
- e) 15

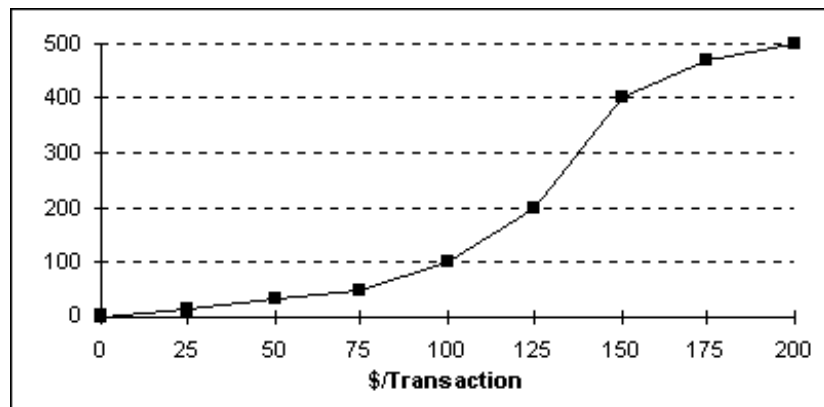
Answer: d

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

54. Each day, the office staff at Oasis Quick Shop prepares a frequency distribution and an ogive of sales transactions by dollar value of the transactions. Saturday's cumulative frequency ogive follows:



The percentage of sales transactions on Saturday that were at least \$100 each was ____.

- a) 100%
- b) 10%
- c) 80%
- d) 20%
- e) 15%

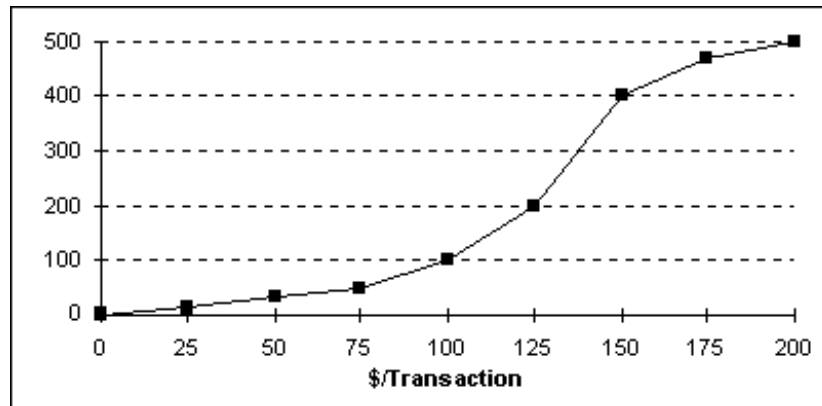
Answer: c

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

55. Each day, the office staff at Oasis Quick Shop prepares a frequency distribution and an ogive of sales transactions by dollar value of the transactions. Saturday's cumulative frequency ogive follows:



The percentage of sales transactions on Saturday that were between \$100 and \$150 was ____.

- a) 20%
- b) 40%
- c) 60%
- d) 80%
- e) 10%

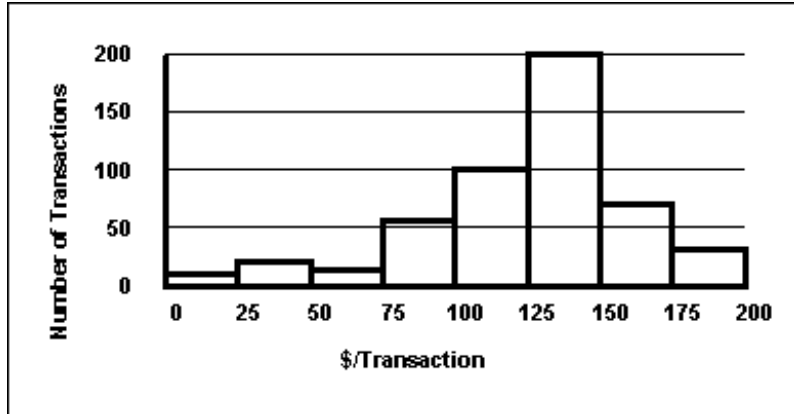
Answer: c

Difficulty: Hard

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

56. Each day, the office staff at Oasis Quick Shop prepares a frequency distribution and a histogram of sales transactions by dollar value of the transactions. Friday's histogram follows:



On Friday, the approximate number of sales transactions in the 125–under 150 category was ____.

- a) 50
- b) 100
- c) 150
- d) 200
- e) 85

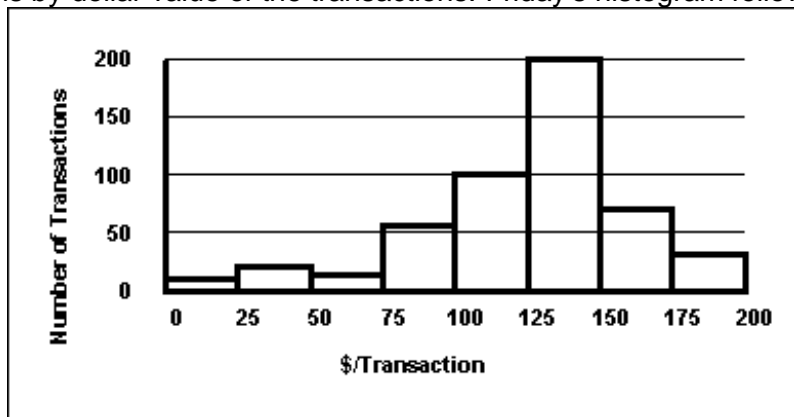
Answer: d

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

57. Each day, the office staff at Oasis Quick Shop prepares a frequency distribution and a histogram of sales transactions by dollar value of the transactions. Friday's histogram follows:



On Friday, the approximate number of sales transactions between \$100 and \$150 was ____.

- a) 100
- b) 200
- c) 300
- d) 400

e) 500

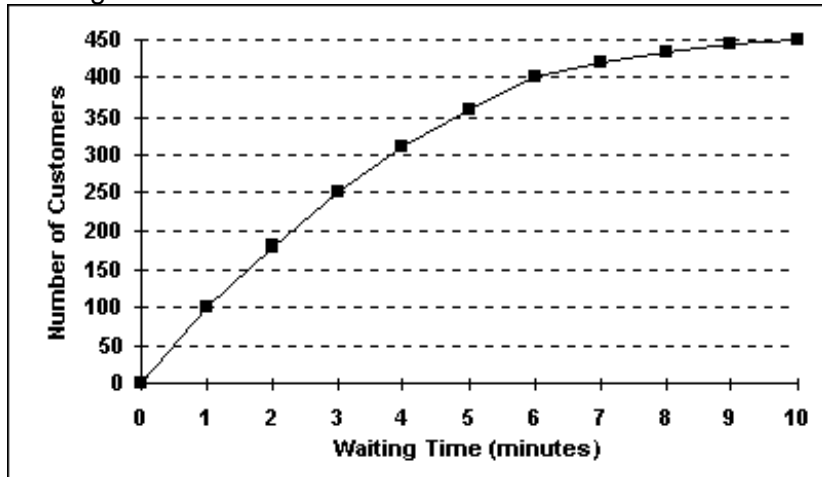
Answer: c

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

58. The staff of Mr. Wayne Wertz, VP of Operations at Portland Peoples Bank, prepared a cumulative frequency ogive of waiting time for walk-in customers.



The total number of walk-in customers included in the study was ____.

- a) 100
- b) 250
- c) 300
- d) 450
- e) 500

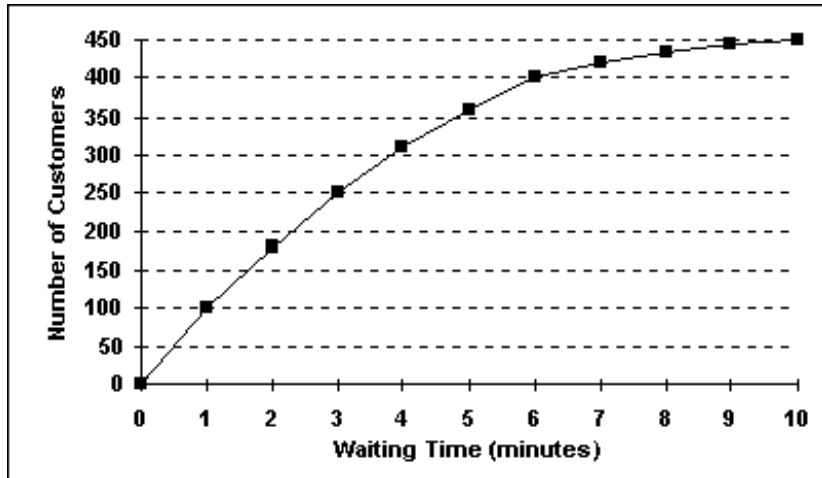
Answer: d

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

59. The staff of Mr. Wayne Wertz, VP of Operations at Portland Peoples Bank, prepared a cumulative frequency ogive of waiting time for walk-in customers.



The percentage of walk-in customers waiting one minute or less was ____.

- a) 22%
- b) 11%
- c) 67%
- d) 10%
- e) 5%

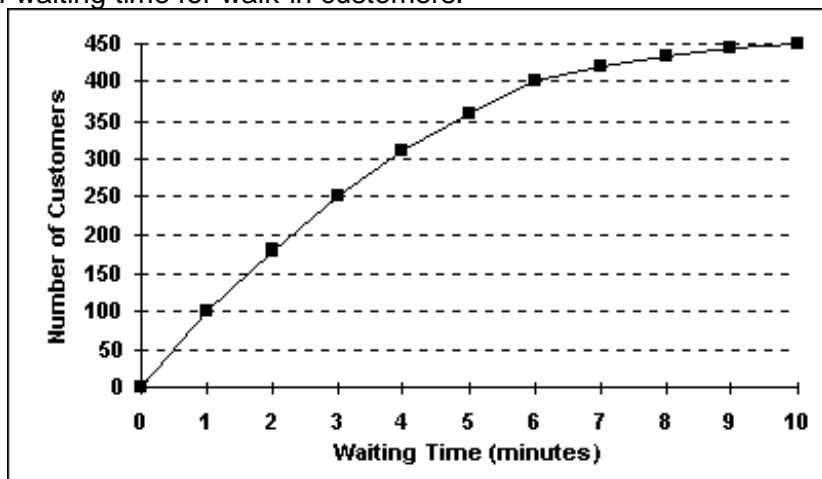
Answer: a

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

60. The staff of Mr. Wayne Wertz, VP of Operations at Portland Peoples Bank, prepared a cumulative frequency ogive of waiting time for walk-in customers.



The percentage of walk-in customers waiting more than 6 minutes was ____.

- a) 22%
- b) 11%

- c) 67%
- d) 10%
- e) 75%

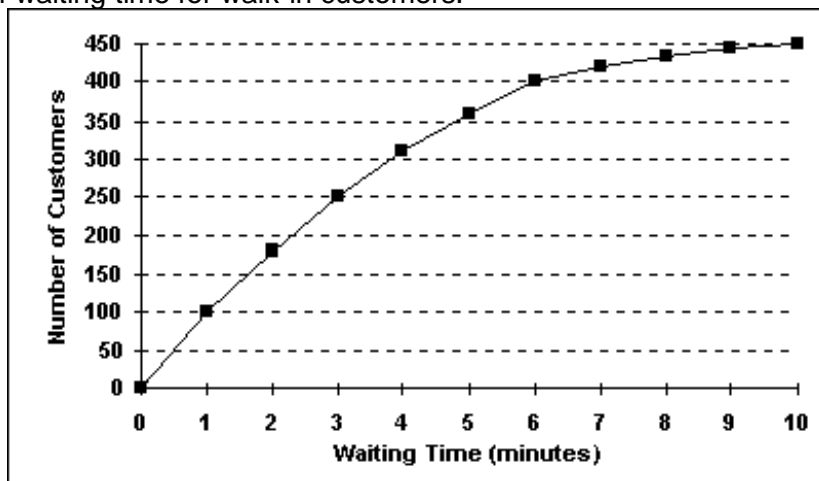
Answer: b

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

61. The staff of Mr. Wayne Wertz, VP of Operations at Portland Peoples Bank, prepared a cumulative frequency ogive of waiting time for walk-in customers.



The percentage of walk-in customers waiting between 1 and 6 minutes was ____.

- a) 22%
- b) 11%
- c) 37%
- d) 10%
- e) 67%

Answer: e

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

62. The staff of Mr. Wayne Wertz, VP of Operations at Portland Peoples Bank, prepared a frequency histogram of waiting time for walk-in customers.



Approximately ____ walk-in customers waited less than 2 minutes.

- a) 20
- b) 30
- c) 100
- d) 180
- e) 200

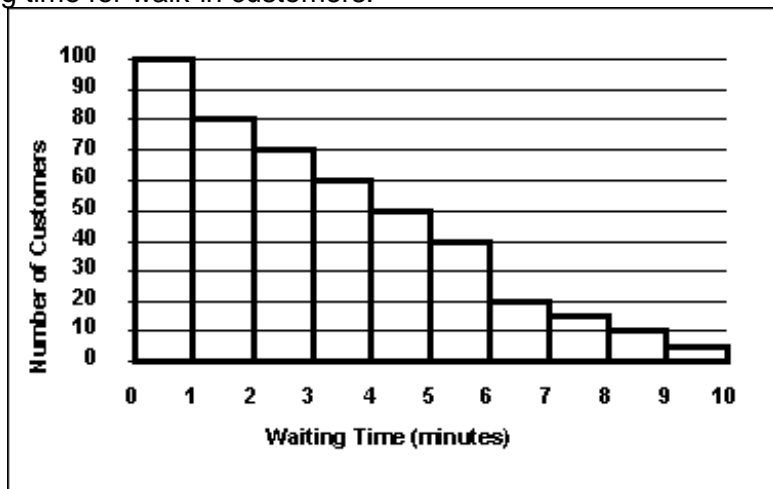
Answer: d

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

63. The staff of Mr. Wayne Wertz, VP of Operations at Portland Peoples Bank, prepared a frequency histogram of waiting time for walk-in customers.



Approximately ____ walk-in customers waited at least 7 minutes.

- a) 20

- b) 30
- c) 100
- d) 180
- e) 200

Answer: b

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

64. The staffs of the accounting and the quality control departments rated their respective supervisor's leadership style as either (1) authoritarian or (2) participatory. Sixty-eight percent of the accounting staff rated their supervisor "authoritarian," and thirty-two percent rated him "participatory." Forty percent of the quality control staff rated their supervisor "authoritarian," and sixty percent rated her "participatory." The best graphic depiction of these data would be two _____.

- a) histograms
- b) frequency polygons
- c) ogives
- d) pie charts
- e) scatter plots

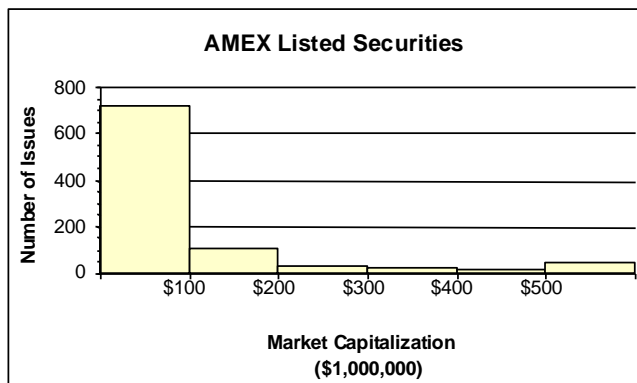
Answer: d

Difficulty: Hard

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

65. The staff of Ms. Tamara Hill, VP of Technical Analysis at Blue Sky Brokerage, prepared a frequency histogram of market capitalization of the 937 corporations listed on the American Stock Exchange in January 2003.



Approximately ____ corporations had capitalization exceeding \$200,000,000.

- a) 50
- b) 100
- c) 700
- d) 800
- e) 890

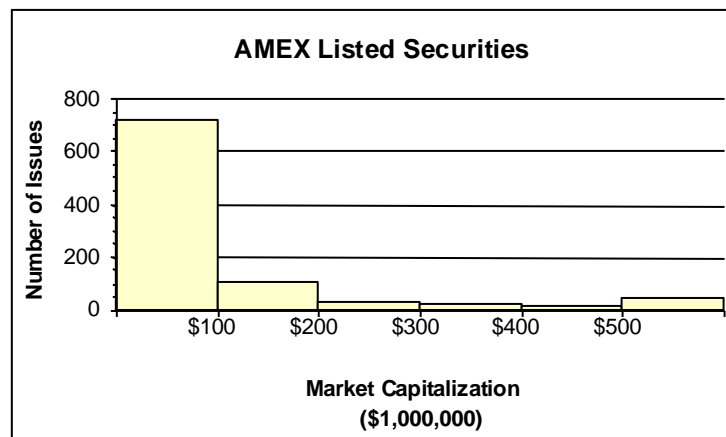
Answer: b

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

66. The staff of Ms. Tamara Hill, VP of Technical Analysis at Blue Sky Brokerage, prepared a frequency histogram of market capitalization of the 937 corporations listed on the American Stock Exchange in January 2003.



Approximately ____ corporations had capitalizations of \$200,000,000 or less.

- a) 50
- b) 100
- c) 700
- d) 800
- e) 900

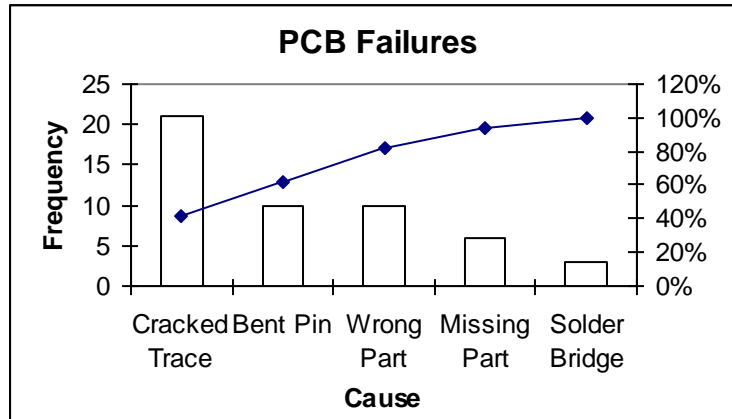
Answer: d

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

67. The following graphic of PCB Failures is a ____.



- a) scatter Plot
- b) Pareto Chart
- c) pie chart
- d) cumulative histogram chart
- e) line diagram

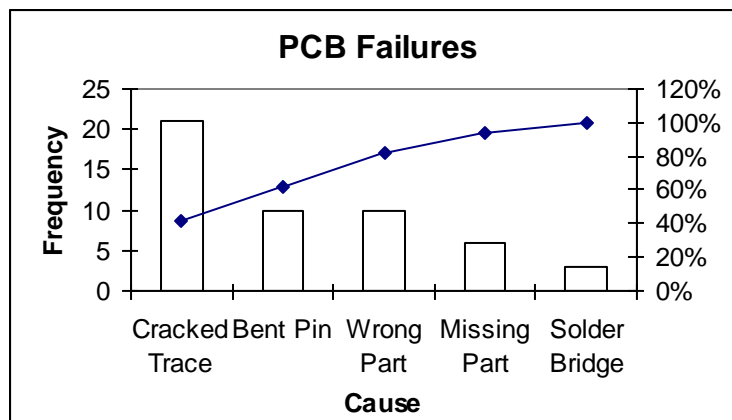
Answer: b

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

68. According to the following graphic the most common cause of PCB Failures is a ____.



- a) cracked trace
- b) bent pin
- c) missing part
- d) solder bridge
- e) wrong part

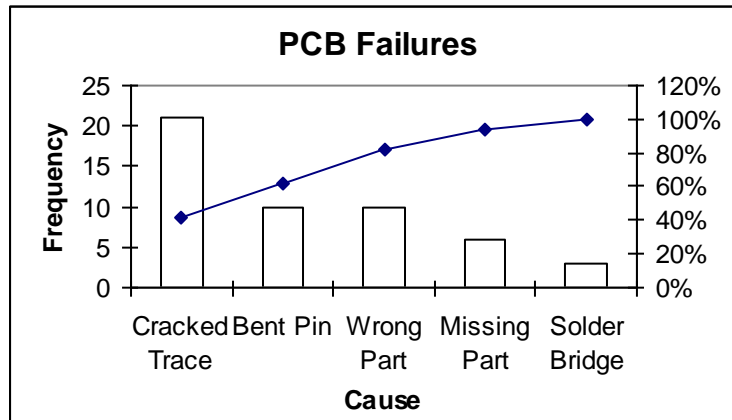
Answer: a

Difficulty: Medium

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

69. According to the following graphic, "Bent Pins" account for ___% of PCB Failures.



- a) 10
- b) 20
- c) 30
- d) 40
- e) 50

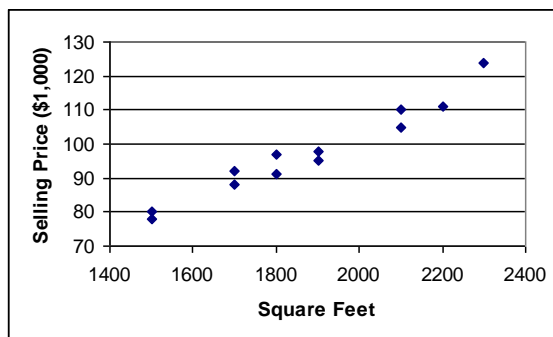
Answer: d

Difficulty: Hard

Learning Objective: Describe and construct different types of quantitative data graphs, including histograms, frequency polygons, ogives, and stem and leaf plots. Explain when these graphs should be used.

Section Reference: 2.2 Quantitative Data Graphs

70. The following graphic of residential housing data (selling price and size in square feet) is a ____.



- a) scatter plot
- b) Pareto chart
- c) pie chart
- d) cumulative histogram
- e) cumulative frequency distribution

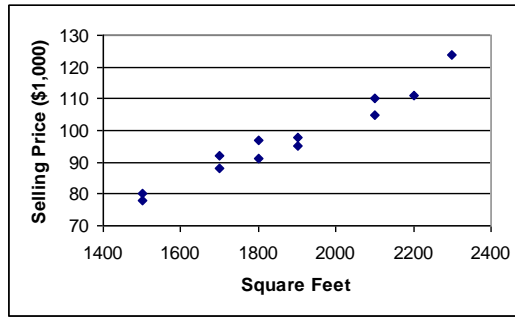
Answer: a

Difficulty: Medium

Learning Objective: Describe and construct different types of qualitative data graphs, including pie charts, bar charts, and Pareto charts. Explain when these graphs should be used.

Section Reference: 2.3 Qualitative Data Graphs

71. The following graphic of residential housing data (selling price and size in square feet) indicates ____.



- a) an inverse relation between the two variables
- b) no relation between the two variables
- c) a direct relation between the two variables
- d) a negative exponential relation between the two variables
- e) a sinusoidal relationship between the two variables

Answer: c

Difficulty: Medium

Learning Objective: Describe and construct different types of qualitative data graphs, including pie charts, bar charts, and Pareto charts. Explain when these graphs should be used.

Section Reference: 2.3 Qualitative Data Graphs

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