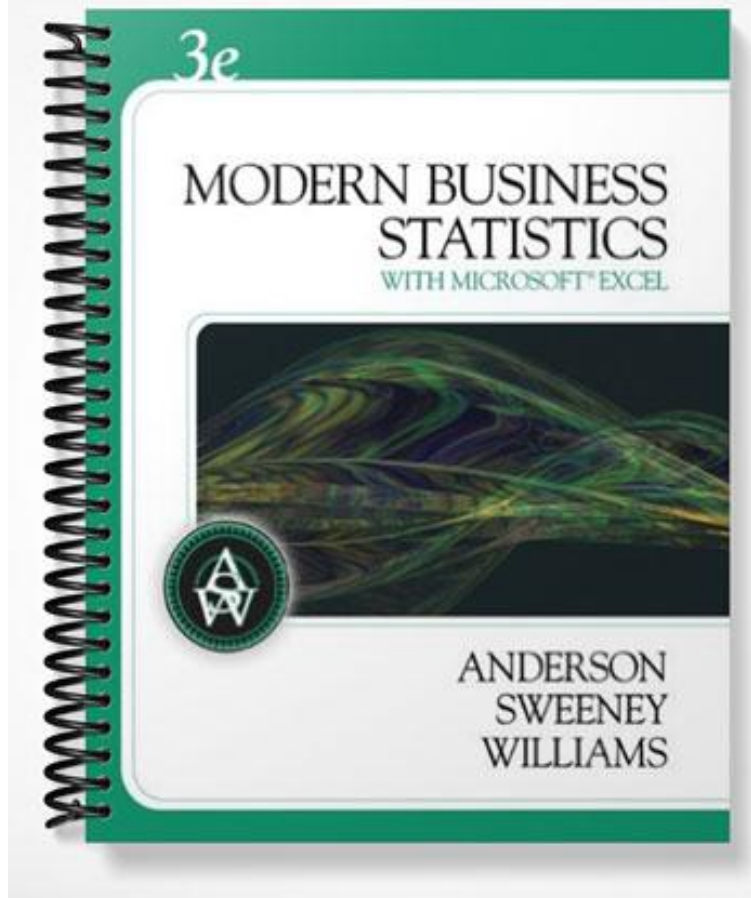


TEST BANK



CHAPTER TWO

DESCRIPTIVE STATISTICS:

TABULAR AND GRAPHICAL PRESENTATIONS

MULTIPLE CHOICE QUESTIONS

In the following multiple-choice questions, circle the correct answer.

1. Data that provide labels or names for categories of like items are known as
- a. categorical data
 - b. quantitative data
 - c. label data
 - d. indicator data

ANSWER: a

2. A researcher is gathering data from four geographical areas designated: South = 1; North = 2; East = 3; West = 4. The designated geographical regions represent
- a. categorical data
 - b. quantitative data
 - c. label data
 - d. either categorical or quantitative data

ANSWER: a

3. Data that indicate how much or how many are known as
- a. categorical data
 - b. quantitative data
 - c. label data
 - d. counter data

ANSWER: b

4. The ages of employees at a company represent
- a. categorical data
 - b. quantitative data
 - c. label data
 - d. longevity data

ANSWER: b

5. A frequency distribution is
- a. a tabular summary of a set of data showing the fraction of items in each of several nonoverlapping classes
 - b. a graphical form of representing data
 - c. a tabular summary of a set of data showing the number of items in each of several nonoverlapping classes
 - d. a graphical device for presenting categorical data

ANSWER: c

6. The sum of frequencies for all classes will always equal

- a. 1
- b. the number of elements in a data set
- c. the number of classes
- d. a value between 0 and 1

ANSWER: b

7. In constructing a frequency distribution, as the number of classes are decreased, the class width

- a. decreases
- b. remains unchanged
- c. increases
- d. can increase or decrease depending on the data values

ANSWER: c

8. If several frequency distributions are constructed from the same data set, the distribution with the widest class width will have the

- a. fewest classes
- b. most classes
- c. same number of classes as the other distributions since all are constructed from the same data
- d. None of the other answers are correct.

ANSWER: a

9. Excel's _____ can be used to construct a frequency distribution for categorical data.

- a. DISTRIBUTION function
- b. SUM function
- c. FREQUENCY function
- d. COUNTIF function

ANSWER: d

10. A tabular summary of a set of data showing the fraction of the total number of items in several nonoverlapping classes is a

- a. frequency distribution.
- b. relative frequency distribution.
- c. frequency.
- d. cumulative frequency distribution.

ANSWER: b

11. The relative frequency of a class is computed by

- a. dividing the midpoint of the class by the sample size.
- b. dividing the frequency of the class by the midpoint.
- c. dividing the sample size by the frequency of the class.
- d. dividing the frequency of the class by the sample size.

ANSWER: d

12. The sum of the relative frequencies for all classes will always equal

- a. the sample size
- b. the number of classes
- c. one
- d. 100

ANSWER: c

13. A tabular summary of data showing the percentage of items in each of several nonoverlapping classes is a

- a. frequency distribution
- b. relative frequency distribution
- c. percent frequency distribution
- d. cumulative percent frequency distribution

ANSWER: c

14. The percent frequency of a class is computed by

- a. multiplying the relative frequency by 10
- b. dividing the relative frequency by 100
- c. multiplying the relative frequency by 100
- d. adding 100 to the relative frequency

ANSWER: c

15. The sum of the percent frequencies for all classes will always equal

- a. one
- b. the number of classes
- c. the number of items in the study
- d. 100

ANSWER: d

16. In a cumulative frequency distribution, the last class will always have a cumulative frequency equal to

- a. one
- b. 100%
- c. the total number of elements in the data set
- d. None of the other answers are correct.

ANSWER: c

17. In a cumulative relative frequency distribution, the last class will have a cumulative relative frequency equal to

- a. one
- b. zero
- c. 100
- d. None of the other answers are correct.

ANSWER: a

18. In a cumulative percent frequency distribution, the last class will have a cumulative percent frequency equal to

- a. one
- b. 100
- c. the total number of elements in the data set
- d. None of the other answers are correct.

ANSWER: b

19. The difference between the lower class limits of adjacent classes provides the
- a. number of classes
 - b. class limits
 - c. class midpoint
 - d. class width

ANSWER: d

Exhibit 2-1

The numbers of hours worked (per week) by 400 statistics students are shown below.

| <u>Number of hours</u> | <u>Frequency</u> |
|------------------------|------------------|
| 0 – 9 | 20 |
| 10 – 19 | 80 |
| 20 – 29 | 200 |
| 30 – 39 | 100 |

20. Refer to Exhibit 2-1. The class width for this distribution
- a. is 9
 - b. is 10
 - c. is 39, which is: the largest value minus the smallest value or $39 - 0 = 39$
 - d. varies from class to class

ANSWER: b

21. Refer to Exhibit 2-1. The midpoint of the last class is
- a. 50
 - b. 34
 - c. 35
 - d. 34.5

ANSWER: d

22. Refer to Exhibit 2-1. The number of students working 19 hours or less
- a. is 80
 - b. is 100
 - c. is 180
 - d. is 300

ANSWER: b

23. Refer to Exhibit 2-1. The relative frequency of students working 9 hours or less
- a. is 20
 - b. is 100
 - c. is 0.95
 - d. 0.05

ANSWER: d

24. Refer to Exhibit 2-1. The cumulative relative frequency for the class of 20 – 29
- a. is 300
 - b. is 0.25

- c. is 0.75
 - d. is 0.5
- ANSWER: c

25. Refer to Exhibit 2-1. The percentage of students working 10 – 19 hours is
- a. 20%
 - b. 25%
 - c. 75%
 - d. 80%

ANSWER: a

26. Refer to Exhibit 2-1. The percentage of students working 19 hours or less is
- a. 20%
 - b. 25%
 - c. 75%
 - d. 80%

ANSWER: b

27. Refer to Exhibit 2-1. The cumulative percent frequency for the class of 30 – 39 is
- a. 100%
 - b. 75%
 - c. 50%
 - d. 25%

ANSWER: a

28. Refer to Exhibit 2-1. The cumulative frequency for the class of 20 – 29
- a. is 200
 - b. is 300
 - c. is 0.75
 - d. is 0.50

ANSWER: b

29. Refer to Exhibit 2-1. If a cumulative frequency distribution is developed for the above data, the last class will have a cumulative frequency of
- a. 100
 - b. 1
 - c. 30 – 39
 - d. 400

ANSWER: d

30. Refer to Exhibit 2-1. The percentage of students who work at least 10 hours per week is
- a. 50%
 - b. 5%
 - c. 95%
 - d. 100%

ANSWER: c

Exhibit 2-2

Information on the type of industry is provided for a sample of 50 Fortune 500 companies.

| <u>Industry Type</u> | <u>Frequency</u> |
|----------------------|------------------|
| Banking | 7 |
| Consumer Products | 15 |
| Electronics | 10 |
| Retail | 18 |

31. Refer to Exhibit 2-2. The number of industries that are classified as retail is
- 32
 - 18
 - 0.36
 - 36%

ANSWER: b

32. Refer to Exhibit 2-2. The relative frequency of industries that are classified as banking is
- 7
 - 0.07
 - 0.70
 - 0.14

ANSWER: d

33. Refer to Exhibit 2-2. The percent frequency of industries that are classified as electronics is
- 10
 - 20
 - 0.10
 - 0.20

ANSWER: b

Exhibit 2-3

The number of sick days taken (per month) by 200 factory workers is summarized below.

| <u>Number of Days</u> | <u>Frequency</u> |
|-----------------------|------------------|
| 0 – 5 | 120 |
| 6 – 10 | 65 |
| 11 – 15 | 14 |
| 16 – 20 | 1 |

34. Refer to Exhibit 2-3. The class width for this distribution
- is 5
 - is 6
 - is 20, which is: the largest value minus the smallest value or $20 - 0 = 20$
 - varies from class to class

ANSWER: b

35. Refer to Exhibit 2-3. The midpoint of the first class is
- 10

- b. 2
 - c. 2.5
 - d. 3
- ANSWER: c

36. Refer to Exhibit 2-3. The number of workers who took less than 11 sick days per month
- a. was 15
 - b. was 200
 - c. was 185
 - d. was 65

ANSWER: c

37. Refer to Exhibit 2-3. The number of workers who took at most 10 sick days per month
- a. was 15
 - b. was 200
 - c. was 185
 - d. was 65

ANSWER: c

38. Refer to Exhibit 2-3. The number of workers who took more than 10 sick days per month
- a. was 15
 - b. was 200
 - c. was 185
 - d. was 65

ANSWER: a

39. Refer to Exhibit 2-3. The number of workers who took at least 11 sick days per month
- a. was 15
 - b. was 200
 - c. was 185
 - d. was 65

ANSWER: a

40. Refer to Exhibit 2-3. The relative frequency of workers who took 10 or fewer sick days
- a. was 185
 - b. was 0.925
 - c. was 93
 - d. was 15

ANSWER: b

41. Refer to Exhibit 2-3. The cumulative relative frequency for the class of 11 – 15
- a. is 199
 - b. is 0.07
 - c. is 1
 - d. is 0.995

ANSWER: d

42. Refer to Exhibit 2-3. The percentage of workers who took 0 – 5 sick days per month was

- a. 20%
- b. 120%
- c. 75%
- d. 60%

ANSWER: d

43. Refer to Exhibit 2-3. The cumulative percent frequency for the class of 16 – 20 is

- a. 100%
- b. 65%
- c. 92.5%
- d. 0.5%

ANSWER: a

44. Refer to Exhibit 2-3. The cumulative frequency for the class of 11 – 15

- a. is 200
- b. is 14
- c. is 199
- d. is 1

ANSWER: c

45. A graphical device for depicting categorical data that have been summarized in a frequency distribution, relative frequency distribution, or percent frequency distribution is a(n)

- a. histogram
- b. stem-and-leaf display
- c. ogive
- d. bar graph

ANSWER: d

46. A graphical device for presenting categorical data summaries based on subdivision of a circle into sectors that correspond to the relative frequency for each class is a

- a. histogram
- b. stem-and-leaf display
- c. pie chart
- d. bar graph

ANSWER: c

47. Categorical data can be graphically represented by using a(n)

- a. histogram
- b. frequency polygon
- c. ogive
- d. bar graph

ANSWER: d

48. Fifteen percent of the students in a School of Business Administration are majoring in Economics, 20% in Finance, 35% in Management, and 30% in Accounting. The graphical device(s) that can be used to present these data is (are)

- a. a line graph
- b. only a bar graph

- c. only a pie chart
- d. both a bar graph and a pie chart

ANSWER: d

49. Methods that use simple arithmetic and easy-to-draw graphs to summarize data quickly are called

- a. exploratory data analysis
- b. relative frequency distributions
- c. bar graphs
- d. pie charts

ANSWER: a

50. The total number of data items with a value less than or equal to the upper limit for the class is given by the

- a. frequency distribution
- b. relative frequency distribution
- c. cumulative frequency distribution
- d. cumulative relative frequency distribution

ANSWER: c

51. Excel's _____ can be used to construct a frequency distribution for quantitative data.

- a. COUNTIF function
- b. SUM function
- c. PivotTable Report
- d. AVERAGE function

ANSWER: c

52. A graphical presentation of a frequency distribution, relative frequency distribution, or percent frequency distribution of quantitative data constructed by placing the class intervals on the horizontal axis and the frequencies on the vertical axis is a

- a. histogram
- b. bar graph
- c. stem-and-leaf display
- d. pie chart

ANSWER: a

53. A common graphical presentation of quantitative data is a

- a. histogram
- b. bar graph
- c. relative frequency
- d. pie chart

ANSWER: a

54. When using Excel to create a _____ one must edit the chart to remove the gaps between rectangles.

- a. scatter diagram
- b. bar graph
- c. histogram
- d. pie chart

ANSWER: c

55. A _____ can be used to graphically present quantitative data.

- a. histogram
- b. pie chart
- c. stem-and-leaf display
- d. both a histogram and a stem-and-leaf display are correct

ANSWER: d

56. A(n) _____ is a graph of a cumulative distribution.

- a. histogram
- b. pie chart
- c. stem-and-leaf display
- d. ogive

ANSWER: d

57. Excel's Chart Tools can be used to construct a

- a. bar graph
- b. pie chart
- c. histogram
- d. All of these can be constructed using Excel's Chart Tools.

ANSWER: d

58. To construct a bar graph using Excel's Chart Tools, choose _____ as the chart type.

- a. column
- b. pie
- c. scatter
- d. line

ANSWER: a

59. To construct a pie chart using Excel's Chart Tools, choose _____ as the chart type.

- a. column
- b. pie
- c. scatter
- d. line

ANSWER: b

60. To construct a histogram using Excel's Chart Tools, choose _____ as the chart type.

- a. column
- b. pie
- c. scatter
- d. line

ANSWER: a

61. Excel's Chart Tools does not have a chart type for constructing a

- a. bar graph
- b. pie chart
- c. histogram

- d. stem-and-leaf display
ANSWER: d

62. A tabular method that can be used to summarize the data on two variables simultaneously is called
a. simultaneous equations
b. a crosstabulation
c. a histogram
d. a dot plot
ANSWER: b

63. Excel's _____ can be used to construct a crosstabulation.
a. Chart Tools
b. SUM function
c. PivotTable Report
d. COUNTIF function
ANSWER: c

64. In a crosstabulation
a. both variables must be categorical
b. both variables must be quantitative
c. one variable must be categorical and the other must be quantitative
d. either or both variables can be categorical or quantitative
ANSWER: d

Exhibit 2-4

A survey of 400 college seniors resulted in the following crosstabulation regarding their undergraduate major and whether or not they plan to go to graduate school.

| <u>Graduate School</u> | <u>Undergraduate Major</u> | | | <u>Total</u> |
|------------------------|----------------------------|--------------------|---------------|--------------|
| | <u>Business</u> | <u>Engineering</u> | <u>Others</u> | |
| Yes | 35 | 42 | 63 | 140 |
| No | 91 | 104 | 65 | 260 |
| Total | 126 | 146 | 128 | 400 |

65. Refer to Exhibit 2-4. What percentage of the students does not plan to go to graduate school?
a. 280
b. 520
c. 65
d. 32
ANSWER: c

66. Refer to Exhibit 2-4. What percentage of the students' undergraduate major is engineering?
a. 292
b. 520
c. 65

d. 36.5
ANSWER: d

67. Refer to Exhibit 2-4. Of those students who are majoring in business, what percentage plans to go to graduate school?
a. 27.78
b. 8.75
c. 70
d. 72.22

ANSWER: a

68. Refer to Exhibit 2-4. Among the students who plan to go to graduate school, what percentage indicated "Other" majors?
a. 15.75
b. 45
c. 54
d. 35

ANSWER: b

69. A graphical presentation of the relationship between two quantitative variables is
a. a pie chart
b. a histogram
c. a crosstabulation
d. a scatter diagram

ANSWER: d

70. Excel's _____ can be used to construct a scatter diagram.
a. Chart Tools
b. SUM function
c. CROSSTAB function
d. COUNTIF function

ANSWER: a

71. When the conclusions based upon the aggregated crosstabulation can be completely reversed if we look at the unaggregated data, the occurrence is known as
a. reverse correlation
b. inferential statistics
c. Simpson's paradox
d. disaggregation

ANSWER: c

72. Before drawing any conclusions about the relationship between two variables shown in a crosstabulation, you should
a. investigate whether any hidden variables could affect the conclusions
b. construct a scatter diagram and find the trendline
c. develop a relative frequency distribution
d. construct an ogive for each of the variables

ANSWER: a

PROBLEMS

1. Thirty students in the School of Business were asked what their majors were. The following represents their responses (M = Management; A = Accounting; E = Economics; O = Others).

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| A | M | M | A | M | M | E | M | O | A |
| E | E | M | A | O | E | M | A | M | A |
| M | A | O | A | M | E | E | M | A | M |

- a. Construct a frequency distribution and a bar graph.
- b. Construct a relative frequency distribution and a pie chart.

ANSWERS:

a. and b.

| <u>Major</u> | <u>Frequency</u> | <u>Relative Frequency</u> |
|--------------|------------------|---------------------------|
| M | 12 | 0.4 |
| A | 9 | 0.3 |
| E | 6 | 0.2 |
| O | <u>3</u> | <u>0.1</u> |
| Total | 30 | 1.0 |

2. Twenty employees of ABC Corporation were asked if they liked or disliked the new district manager. Below are their responses. Let L represent liked and D represent disliked.

| | | | | |
|---|---|---|---|---|
| L | L | D | L | D |
| D | D | L | L | D |
| D | L | D | D | L |
| D | D | D | D | L |

- a. Construct a frequency distribution and a bar graph.
- b. Construct a relative frequency distribution and a pie chart.

ANSWERS:

a. and b.

| <u>Preferences</u> | <u>Frequency</u> | <u>Relative Frequency</u> |
|--------------------|------------------|---------------------------|
| L | 8 | 0.4 |
| D | <u>12</u> | <u>0.6</u> |
| Total | 20 | 1.0 |

3. A student has completed 20 courses in the School of Arts and Sciences. Her grades in the 20 courses are shown below.

| | | | | |
|---|---|---|---|---|
| A | B | A | B | C |
| C | C | B | B | B |
| B | A | B | B | B |
| C | B | C | B | A |

- Develop a frequency distribution and a bar graph for her grades.
- Develop a relative frequency distribution for her grades and construct a pie chart.

ANSWERS:

a. and b.

| <u>Grade</u> | <u>Frequency</u> | <u>Relative Frequency</u> |
|--------------|------------------|---------------------------|
| A | 4 | 0.20 |
| B | 11 | 0.55 |
| C | <u>5</u> | <u>0.25</u> |
| Total | 20 | 1.00 |

4. A sample of 50 TV viewers were asked, "Should TV sponsors pull their sponsorship from programs that draw numerous viewer complaints?" Below are the results of the survey. (Y = Yes; N = No; W = Without Opinion)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| N | W | N | N | Y | N | N | N | Y | N |
| N | Y | N | N | N | N | N | Y | N | N |
| Y | N | Y | W | N | Y | W | W | N | Y |
| W | W | N | W | Y | W | N | W | Y | W |
| N | Y | N | Y | N | W | Y | Y | N | Y |

- Construct a frequency distribution and a bar graph.
- Construct a relative frequency distribution and a pie chart.

ANSWERS:

a. and b.

| <u>Response</u> | <u>Frequency</u> | <u>Relative Frequency</u> |
|-----------------|------------------|---------------------------|
| No | 24 | 0.48 |
| Yes | 15 | 0.30 |
| Without Opinion | <u>11</u> | <u>0.22</u> |
| Total | 50 | 1.00 |

5. Forty shoppers were asked if they preferred the weight of a can of soup to be 6 ounces, 8 ounces, or 10 ounces. Below are their responses.

| | | | | | | | | | |
|----|----|---|----|---|---|---|----|---|---|
| 6 | 6 | 6 | 10 | 8 | 8 | 8 | 10 | 6 | 6 |
| 10 | 10 | 8 | 8 | 6 | 6 | 6 | 8 | 6 | 6 |

| | | | | | | | | | |
|---|---|---|----|----|----|---|----|---|---|
| 8 | 8 | 8 | 10 | 8 | 8 | 6 | 10 | 8 | 6 |
| 6 | 8 | 8 | 8 | 10 | 10 | 8 | 10 | 8 | 6 |

- Construct a frequency distribution and graphically represent the frequency distribution.
- Construct a relative frequency distribution and graphically represent the relative frequency distribution.

ANSWERS:

a. and b.

| <u>Preferences</u> | <u>Frequency</u> | <u>Relative Frequency</u> |
|--------------------|------------------|---------------------------|
| 6 ounces | 14 | 0.350 |
| 8 ounces | 17 | 0.425 |
| 10 ounces | <u>9</u> | <u>0.225</u> |
| Total | 40 | 1.000 |

- There are 800 students in the School of Business Administration. There are four majors in the School: Accounting, Finance, Management, and Marketing. The following shows the number of students in each major.

| <u>Major</u> | <u>Number of Students</u> |
|--------------|---------------------------|
| Accounting | 240 |
| Finance | 160 |
| Management | 320 |
| Marketing | 80 |

Develop a percent frequency distribution and construct a bar chart and a pie chart.

ANSWER:

| <u>Major</u> | <u>Percent Frequency</u> |
|--------------|--------------------------|
| Accounting | 30% |
| Finance | 20% |
| Management | 40% |
| Marketing | 10% |

- Below you are given the examination scores of 20 students.

| | | | | |
|----|----|----|----|----|
| 52 | 99 | 92 | 86 | 84 |
| 63 | 72 | 76 | 95 | 88 |
| 92 | 58 | 65 | 79 | 80 |
| 90 | 75 | 74 | 56 | 99 |

- Construct a frequency distribution for this data. Let the first class be 50 – 59 and draw a histogram.
- Construct a cumulative frequency distribution.
- Construct a relative frequency distribution.
- Construct a cumulative relative frequency distribution.

ANSWERS:

| | a. | b. | c. | d. |
|--------------|------------------|---------------------------------|-------------------------------|--|
| <u>Score</u> | <u>Frequency</u> | <u>Cumulative Frequency</u> | <u>Relative Frequency</u> | <u>Cumulative Relative Frequency</u> |
| 50 – 59 | 3 | 3 | 0.15 | 0.15 |
| 60 – 69 | 2 | 5 | 0.10 | 0.25 |
| 70 – 79 | 5 | 10 | 0.25 | 0.50 |
| 80 – 89 | 4 | 14 | 0.20 | 0.70 |
| 90 – 99 | <u>6</u> | 20 | <u>0.30</u> | 1.00 |
| Total | 20 | | 1.00 | |

- Two hundred members of a fitness center were surveyed. One survey item stated, “The facilities are always clean.” The members’ responses to the item are summarized below. Fill in the missing value for the frequency distribution.

| <u>Opinion</u> | <u>Frequency</u> |
|-------------------|------------------|
| Strongly Agree | 63 |
| Agree | 92 |
| Disagree | |
| Strongly Disagree | 15 |
| No Opinion | 14 |

ANSWER: 16

- Fill in the missing value for the following relative frequency distribution.

| <u>Opinion</u> | <u>Relative Frequency</u> |
|-------------------|---------------------------|
| Strongly Agree | 0.315 |
| Agree | 0.460 |
| Disagree | |
| Strongly Disagree | 0.075 |
| No Opinion | 0.070 |

ANSWER: 0.080

- Fill in the missing value for the following percent frequency distribution.

| <u>Annual Salaries</u> | <u>Percent Frequency</u> |
|------------------------|--------------------------|
| Under \$30,000 | 10 |

| | |
|-------------------|----|
| \$30,000 – 49,999 | 35 |
| \$50,000 – 69,999 | 40 |
| \$70,000 – 89,999 | |
| \$90,000 and over | 5 |

ANSWER: 10

11. The following is a summary of the number of hours spent per day watching television for a sample of 100 people. What is wrong with the frequency distribution?

| <u>Hours/Day</u> | <u>Frequency</u> |
|------------------|------------------|
| 0 – 1 | 10 |
| 1 – 3 | 45 |
| 3 – 5 | 20 |
| 5 – 7 | 20 |
| 7 – 9 | 5 |

ANSWER: The classes overlap.

12. A summary of the results of a job satisfaction survey follows. What is wrong with the relative frequency distribution?

| <u>Rating</u> | <u>Relative Frequency</u> |
|---------------|---------------------------|
| Poor | .15 |
| Fair | .45 |
| Good | .25 |
| Excellent | .30 |

ANSWER: The relative frequencies do not sum to 1.

13. The frequency distribution below was constructed from data collected from a group of 25 students.

| <u>Height in Inches</u> | <u>Frequency</u> |
|-------------------------|------------------|
| 58 – 63 | 3 |
| 64 – 69 | 5 |
| 70 – 75 | 2 |
| 76 – 81 | 6 |
| 82 – 87 | 4 |
| 88 – 93 | 3 |
| 94 – 99 | 2 |

- Construct a relative frequency distribution.
- Construct a cumulative frequency distribution.
- Construct a cumulative relative frequency distribution.

ANSWERS:

| | | a. | b. | c. |
|------------------------|------------------|---------------------------|-----------------------------|--------------------------------------|
| <u>Height (inches)</u> | <u>Frequency</u> | <u>Relative Frequency</u> | <u>Cumulative Frequency</u> | <u>Cumulative Relative Frequency</u> |
| 58 – 63 | 3 | 0.12 | 3 | 0.12 |
| 64 – 69 | 5 | 0.20 | 8 | 0.32 |
| 70 – 75 | 2 | 0.08 | 10 | 0.40 |
| 76 – 81 | 6 | 0.24 | 16 | 0.64 |
| 82 – 87 | 4 | 0.16 | 20 | 0.80 |
| 88 – 93 | 3 | 0.12 | 23 | 0.92 |
| 94 – 99 | 2 | <u>0.08</u> | 25 | 1.00 |
| | | 1.00 | | |

14. The frequency distribution below was constructed from data collected on the quarts of soft drinks consumed per week by 20 students.

| <u>Quarts of Soft Drink</u> | <u>Frequency</u> |
|-----------------------------|------------------|
| 0 – 3 | 4 |
| 4 – 7 | 5 |
| 8 – 11 | 6 |
| 12 – 15 | 3 |
| 16 – 19 | 2 |

- Construct a relative frequency distribution.
- Construct a cumulative frequency distribution.
- Construct a cumulative relative frequency distribution.

ANSWERS:

| | a. | b. | c. |
|------------------------------|---------------------------|-----------------------------|--------------------------------------|
| <u>Quarts of Soft Drinks</u> | <u>Relative Frequency</u> | <u>Cumulative Frequency</u> | <u>Cumulative Relative Frequency</u> |
| 0 – 3 | 0.20 | 4 | 0.20 |
| 4 – 7 | 0.25 | 9 | 0.45 |
| 8 – 11 | 0.30 | 15 | 0.75 |
| 12 – 15 | 0.15 | 18 | 0.90 |
| 16 – 19 | <u>0.10</u> | 20 | 1.00 |
| Total | 1.00 | | |

15. The grades of 10 students on their first management test are shown below.

| | | | | |
|----|----|----|----|----|
| 94 | 61 | 96 | 66 | 92 |
| 68 | 75 | 85 | 84 | 78 |

- Construct a frequency distribution. Let the first class be 60 – 69.
- Construct a cumulative frequency distribution.

- c. Construct a relative frequency distribution.

ANSWERS:

| | a. | b. | c. |
|--------------|------------------|---------------------------------|-------------------------------|
| <u>Class</u> | <u>Frequency</u> | <u>Cumulative Frequency</u> | <u>Relative Frequency</u> |
| 60 – 69 | 3 | 3 | 0.3 |
| 70 – 79 | 2 | 5 | 0.2 |
| 80 – 89 | 2 | 7 | 0.2 |
| 90 – 99 | <u>3</u> | 10 | <u>0.3</u> |
| Total | 10 | | 1.0 |

16. You are given the following data on the ages of employees at a company. Construct a stem-and-leaf display. Specify the leaf unit for the display.

```

26    32    28    45    58
52    44    36    42    27
41    53    55    48    32
42    44    40    36    37

```

ANSWER:

Leaf Unit = 1

```

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

```

17. Construct a stem-and-leaf display for the following data. Specify the leaf unit for the display.

```

12    52    51    37    47    40    38    26    57    31
49    43    45    19    36    32    44    48    22    18

```

ANSWER:

Leaf Unit = 1

```

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

```

18. You are given the following data on the earnings per share for ten companies. Construct a stem-and-leaf display. Specify the leaf unit for the display.

```

2.6    1.4    1.3    0.5    2.2
1.1    1.1    0.7    0.9    2.0

```

ANSWER:

Leaf Unit = 0.1

```
0 | 5    7    9
1 | 1    1    3    4
2 | 0    2    6
```

19. You are given the following data on the annual salaries for eight employees. Construct a stem-and-leaf display. Specify the leaf unit for the display.

| | | | |
|----------|----------|----------|----------|
| \$26,500 | \$27,850 | \$25,000 | \$27,460 |
| \$26,890 | \$25,400 | \$26,150 | \$30,000 |

ANSWER:

Leaf Unit = 100

```
25 | 0    4
26 | 1    5    8
27 | 4    8
28 |
29 |
30 | 0
```

20. You are given the following data on the price/earnings (P/E) ratios for twelve companies. Construct a stem-and-leaf display. Specify the leaf unit for the display.

| | | | | | |
|----|----|----|----|----|----|
| 23 | 25 | 39 | 47 | 22 | 37 |
| 8 | 36 | 48 | 28 | 37 | 26 |

ANSWER:

Leaf Unit = 1

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

21. You are given the following data on times (in minutes) to complete a race. Construct a stem-and-leaf display. Specify the leaf unit for the display.

| | | | | |
|------|------|------|------|------|
| 15.2 | 15.8 | 12.4 | 11.9 | 15.2 |
| 14.7 | 14.8 | 11.8 | 12.0 | 12.1 |

ANSWER:

Leaf Unit = 0.1

```
11 | 8    9
12 | 0    1    4
13 |
14 | 7    8
```

22. The SAT math scores of a sample of business school students and their genders are shown below.

| <u>Gender</u> | <u>SAT Math Scores</u> | | | <u>Total</u> |
|---------------|------------------------|----------------------|---------------------|--------------|
| | <u>Less than 400</u> | <u>400 up to 600</u> | <u>600 and more</u> | |
| Female | 24 | 168 | 48 | 240 |
| Male | <u>40</u> | <u>96</u> | <u>24</u> | <u>160</u> |
| Total | 64 | 264 | 72 | 400 |

- How many students scored less than 400?
- How many students were female?
- Of the male students, how many scored 600 or more?
- Compute row percentages and comment on any relationship that may exist between SAT math scores and gender of the individuals.
- Compute column percentages.

ANSWERS:

- 64
- 240
- 24
-

| <u>Gender</u> | <u>SAT Math Scores</u> | | | <u>Total</u> |
|---------------|------------------------|----------------------|---------------------|--------------|
| | <u>Less than 400</u> | <u>400 up to 600</u> | <u>600 and more</u> | |
| Female | 10% | 70% | 20% | 100% |
| Male | 25% | 60% | 15% | 100% |

From the above percentages it can be noted that the largest percentages of both genders' SAT scores are in the 400 to 600 range. However, 70% of females and only 60% of males have SAT scores in this range. Also it can be noted that 10% of females' SAT scores are under 400, whereas, 25% of males' SAT scores fall in this category.

e.

| <u>Gender</u> | <u>SAT Math Scores</u> | | |
|---------------|------------------------|----------------------|---------------------|
| | <u>Less than 400</u> | <u>400 up to 600</u> | <u>600 and more</u> |
| Female | 37.5% | 63.6% | 66.7% |
| Male | 62.5% | 36.4% | 33.3% |
| Total | 100% | 100% | 100% |

23. A market research firm has conducted a study to determine consumer preference for a new package design for a particular product. The consumers, ages were also noted.

| | <u>Package Design</u> | | | |
|------------|-----------------------|-----------|----------|--------------|
| <u>Age</u> | <u>A</u> | <u>B</u> | <u>C</u> | <u>Total</u> |
| Under 25 | 18 | 18 | 29 | 65 |
| 25 – 40 | <u>18</u> | <u>12</u> | <u>5</u> | <u>35</u> |
| Total | 36 | 30 | 34 | 100 |

- Which package design was most preferred overall?
- What percent of those participating in the study preferred package A?
- What percent of those under 25 years of age preferred package A?
- What percent of those aged 25 – 40 preferred package A?
- Is the preference for package A the same for both age groups?

ANSWERS:

- Design A
- 36%
- 27.7%
- 51.4%
- No, although both groups have the 18 people who prefer Design A, the percentage of those in the “Under 25” age group who prefer Design A is smaller than that of the “25 – 40” age group (27.7% vs. 51.4%).

24. Partial results of a study follow in a crosstabulation of column percentages.

| | <u>Method of Payment</u> | | |
|---------------|--------------------------|--------------------|--------------|
| <u>Gender</u> | <u>Cash</u> | <u>Credit Card</u> | <u>Check</u> |
| Female | 18% | 50% | 90% |
| Male | 82% | 50% | 10% |
| Total | 100% | 100% | 100% |

- Interpret the 18% found in the first row and first column of the crosstabulation.
- If 50 of those in the study paid by check, how many of the males paid by check?

ANSWERS:

- Of those who pay with cash, 18% are female.
- 5

25. For the following observations, plot a scatter diagram and indicate what kind of relationship (if any) exist between x and y .

| <u>x</u> | <u>y</u> |
|-----------------------|-----------------------|
| 2 | 7 |
| 6 | 19 |
| 3 | 9 |
| 5 | 17 |
| 4 | 11 |

ANSWER: A positive relationship between x and y appears to exist.

26. For the following observations, plot a scatter diagram and indicate what kind of relationship (if any) exists between women's height (inches) and annual starting salary (\$1000).

| <u>Height</u> | <u>Salary</u> |
|---------------|---------------|
| 64 | 45 |
| 63 | 40 |
| 68 | 39 |
| 65 | 38 |
| 67 | 42 |
| 66 | 45 |
| 65 | 43 |
| 64 | 35 |
| 66 | 33 |

ANSWER:

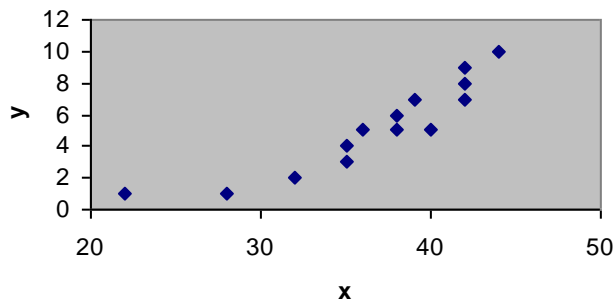
No relationship between women's heights and salaries appears to exist.

27. For the following observations, plot a scatter diagram and indicate what kind of relationship (if any) exists between the amount of sugar in one serving of cereal (grams) and the amount of fiber in one serving of cereal (grams).

| <u>Sugar</u> | <u>Fiber</u> |
|--------------|--------------|
| 1.2 | 3.2 |
| 1.3 | 3.1 |
| 1.5 | 2.8 |
| 1.8 | 2.4 |
| 2.2 | 1.1 |
| 2.8 | 1.3 |
| 3.0 | 1.0 |

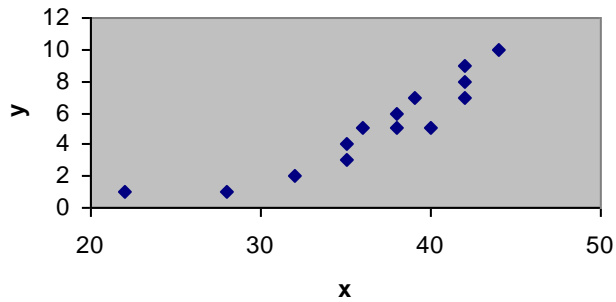
ANSWER: A negative relationship between amount of sugar and amount of fiber appears to exist.

28. What type of graph is depicted below?



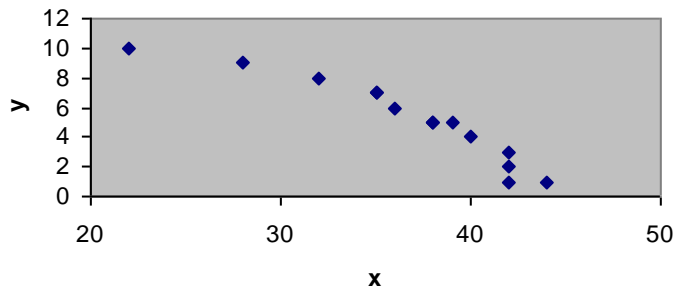
ANSWER: A scatter diagram

29. What type of relationship is depicted in the following scatter diagram?



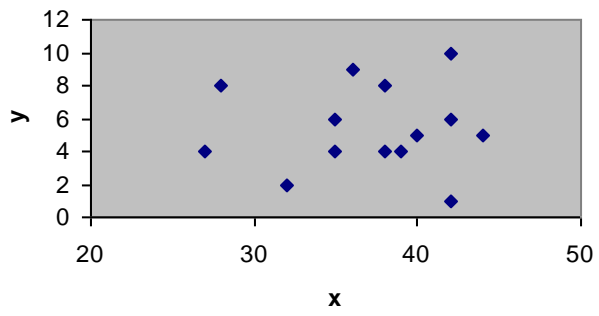
ANSWER: A positive relationship

30. What type of relationship is depicted in the following scatter diagram?



ANSWER: A negative relationship

31. What type of relationship is depicted in the following scatter diagram?



ANSWER: No apparent relationship