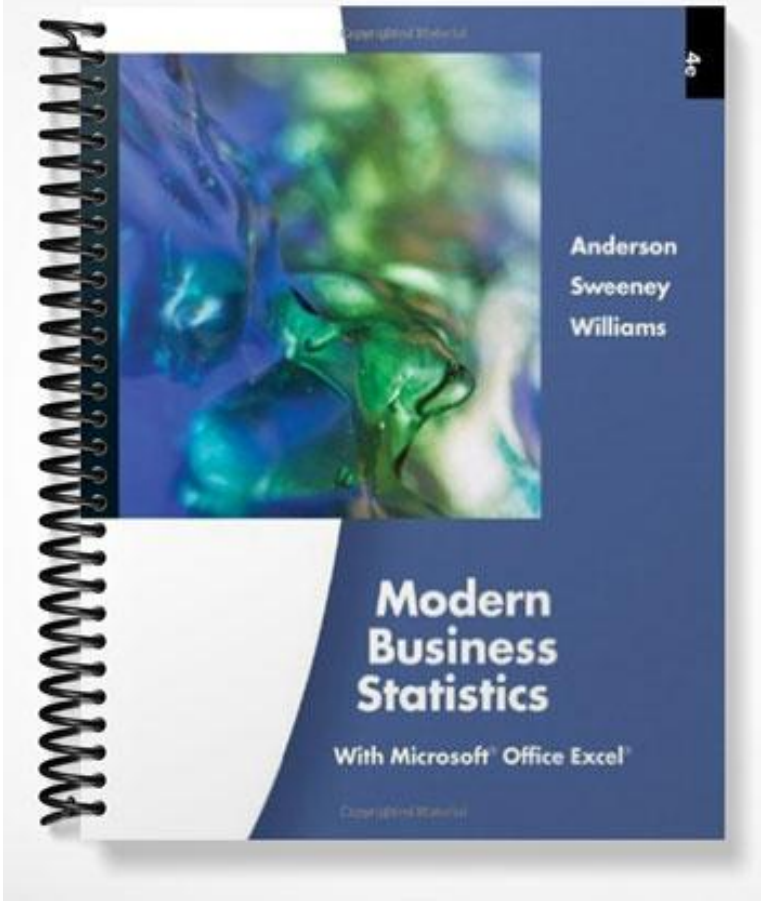
TEST BANK


4e
Anderson
Sweeney
Williams
Modern
Business
Statistics
With Microsoft® Office Excel®

CHAPTER TWO
DESCRIPTIVE STATISTICS:
TABULAR AND GRAPHICAL PRESENTATIONS

MULTIPLE CHOICE QUESTIONS

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

1. The minimum number of variables represented in a bar graph is
   a. one
   b. two
   c. three
   d. four

ANSWER: a

2. The minimum number of variables represented in a histogram is
   a. one
   b. two
   c. three
   d. four

ANSWER: a

3. Which of the following graphical methods is most appropriate for qualitative data?
   a. ogive
   b. pie chart
   c. histogram
   d. scatter diagram

ANSWER: b

4. In a stem-and-leaf display,
   a. a single digit is used to define each stem, and a single digit is used to define each leaf
   b. a single digit is used to define each stem, and one or more digits are used to define each leaf
   c. one or more digits are used to define each stem, and a single digit is used to define each leaf
   d. one or more digits are used to define each stem, and one or more digits are used to define each leaf

ANSWER: c

5. A graphical method that can be used to show both the rank order and shape of a data set simultaneously is a
   a. relative frequency distribution
   b. pie chart

c. stem-and-leaf display
d. pivot table

ANSWER: c

6. The proper way to construct a stem-and-leaf display for the data set {62, 67, 68, 73, 73, 79, 91, 94, 95, 97} is to
a. exclude a stem labeled '8'
b. include a stem labeled '8' and enter no leaves on the stem
c. include a stem labeled '(8)' and enter no leaves on the stem
d. include a stem labeled '8' and enter one leaf value of '0' on the stem

ANSWER: b

7. 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

8. 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

9. Data that indicate how much or how many are know as
a. categorical data
b. quantitative data
c. label data
d. counter data

ANSWER: b

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

ANSWER: b

11. 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

12. The sum of frequencies for all classes will always equal
    a. 1
    b. the number of elements in the data set
    c. the number of classes
    d. a value between 0 and 1

ANSWER: b

13. 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

14. 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

15. 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

16. 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.

A**NSWER:** b

17. 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

18. 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

19. 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

20. 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

21. 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

22. 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

23. 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

24. 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

25. 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.

Number of hours	Frequency
0 – 9	20
10 – 19	80
20 – 29	200
30 – 39	100

26. 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

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

ANSWER: d

28. 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

29. 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

30. 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

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

ANSWER: a

32. 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

33. 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

34. 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

35. 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

36. 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.

Industry Type	Frequency
Banking	7
Consumer Products	15
Electronics	10
Retail	18

37. Refer to Exhibit 2-2. The number of industries that are classified as retail is
    a. 32
    b. 18
    c. 0.36
    d. 36%
ANSWER: b

38. Refer to Exhibit 2-2. The relative frequency of industries that are classified as banking is
    a. 7
    b. 0.07
    c. 0.70
    d. 0.14
ANSWER: d

39. Refer to Exhibit 2-2. The percent frequency of industries that are classified as electronics is
    a. 10
    b. 20
    c. 0.10
    d. 0.20
ANSWER: b

Exhibit 2-3
The number of sick days taken (per month) by 200 factory workers is summarized below.

Number of Days	Frequency
0 – 5	120
6 – 10	65
11 – 15	14
16 – 20	1

40. Refer to Exhibit 2-3. The class width for this distribution
    a. is 5
    b. is 6
    c. is 20, which is: the largest value minus the smallest value or 20 – 0 = 20
    d. varies from class to class

ANSWER: b

41. Refer to Exhibit 2-3. The midpoint of the first class is
    a. 10
    b. 2
    c. 2.5
    d. 3

ANSWER: c

42. 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

43. 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

44. 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

45. 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

46. 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

47. 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

48. 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

49. 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

50. 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

51. 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

52. 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

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

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

ANSWER: d

54. 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

55. 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

56. 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

57. 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

58. 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

59. A common graphical presentation of quantitative data is a
    a. histogram
    b. bar graph
    c. relative frequency
    d. pie chart
ANSWER: a

60. 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

61. 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

62. A(n) _____ is a graph of a cumulative distribution.
    a. histogram
    b. pie chart
    c. stem-and-leaf display
    d. ogive
ANSWER: d

63. 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

64. 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

65. 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

66. To construct a histogram using Excel's Chart Tools, choose _____ as the chart type.
    a. column
    b. pie
    c. scatter
    d. line

ANSWER: a

67. 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

68. 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

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

ANSWER: c

70. 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.

	Undergraduate Major			
Graduate School	Business	Engineering	Others	Total
Yes	35	42	63	140
No	91	104	65	260
Total	126	146	128	400

71. 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

72. 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

73. 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

74. 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

75. 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

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

77. 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

78. 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.

Major	Frequency	Relative Frequency
M	12	0.4
A	9	0.3
E	6	0.2
O	3	0.1
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.

Preferences	Frequency	Relative Frequency
L	8	0.4
D	12	0.6
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

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

ANSWERS:
a. and b.

Grade	Frequency	Relative Frequency
A	4	0.20
B	11	0.55
C	5	0.25
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

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

ANSWERS:

a. and b.

Response	Frequency	Relative Frequency
No	24	0.48
Yes	15	0.30
Without Opinion	11	0.22
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

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

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

ANSWERS:

a. and b.

Preferences	Frequency	Relative Frequency
6 ounces	14	0.350
8 ounces	17	0.425
10 ounces	9	0.225
Total	40	1.000

6. 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.

Major	Number of Students
Accounting	240
Finance	160
Management	320
Marketing	80

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

ANSWER:

Major	Percent Frequency
Accounting	30%
Finance	20%
Management	40%
Marketing	10%

7. 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

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

ANSWERS:

	a.	b.	c.	d.
Score	Frequency	Cumulative Frequency	Relative Frequency	Cumulative Relative Frequency
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	6	20	0.30	1.00
Total	20		1.00	

8. 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.

Opinion	Frequency
Strongly Agree	63
Agree	92
Disagree	
Strongly Disagree	15
No Opinion	14

ANSWER: 16

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

Opinion	Relative Frequency
Strongly Agree	0.315
Agree	0.460
Disagree	
Strongly Disagree	0.075
No Opinion	0.070

ANSWER: 0.080

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

Annual Salaries	Percent Frequency
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?

Hours/Day	Frequency
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?

Rating	Relative Frequency
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.

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

a. Construct a relative frequency distribution.
b. Construct a cumulative frequency distribution.
c. Construct a cumulative relative frequency distribution.

ANSWERS:

		a.	b.	c.
Height (inches)	Frequency	Relative Frequency	Cumulative Frequency	Cumulative Relative Frequency
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	0.08	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.

Quarts of Soft Drink	Frequency
0 – 3	4
4 – 7	5
8 – 11	6
12 – 15	3
16 – 19	2

a. Construct a relative frequency distribution.
b. Construct a cumulative frequency distribution.
c. Construct a cumulative relative frequency distribution.

ANSWERS:

a. b. c.

Quarts of Soft Drinks	Relative Frequency	Cumulative Frequency	Cumulative Relative Frequency
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	0.10	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

a. Construct a frequency distribution. Let the first class be 60 – 69.
b. Construct a cumulative frequency distribution.
c. Construct a relative frequency distribution.

ANSWERS:

	a.	b.	c.
Class	Frequency	Cumulative Frequency	Relative Frequency
60 – 69	3	3	0.3
70 – 79	2	5	0.2
80 – 89	2	7	0.2
90 – 99	3	10	0.3
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
15 | 2 2 8

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

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

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

ANSWERS:

a. 64
b. 240
c. 24
d.

	SAT Math Scores			
Gender	Less than 400	400 up to 600	600 and more	Total
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.

	SAT Math Scores		
Gender	Less than 400	400 up to 600	600 and more
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.

	Package Design			
Age	A	B	C	Total
Under 25	18	18	29	65
25 – 40	18	12	5	35
Total	36	30	34	100

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

ANSWERS:

a. Design A
b. 36%
c. 27.7%
d. 51.4%
e. 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.

	Method of Payment		
Gender	Cash	Credit Card	Check
Female	18%	50%	90%
Male	82%	50%	10%
Total	100%	100%	100%

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

ANSWERS:

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

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

x	*y*
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).

Height	Salary
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.

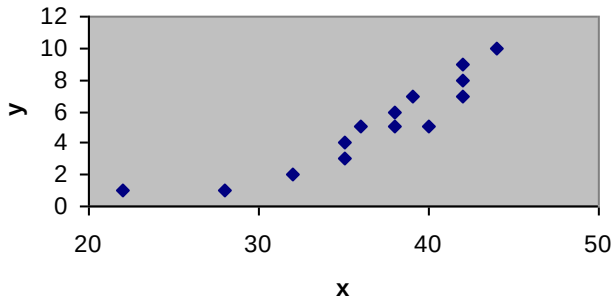
27. For the following observations, plot a scatter diagram and indicate what kind of relationship (if any) exists between the amount of sugar in one serving of cereal (grams) and the amount of fiber in one serving of cereal (grams).

Sugar	Fiber
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

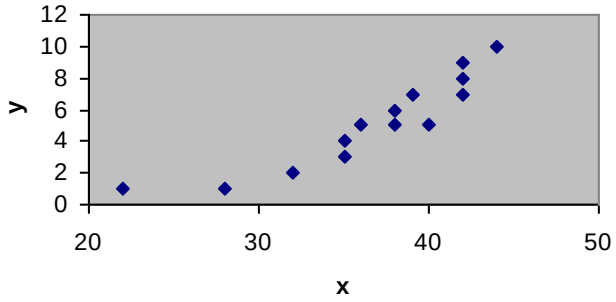
ANSWER: A negative relationship between amount of sugar and amount of fiber appears to exist.

28. What type of graph is depicted below?



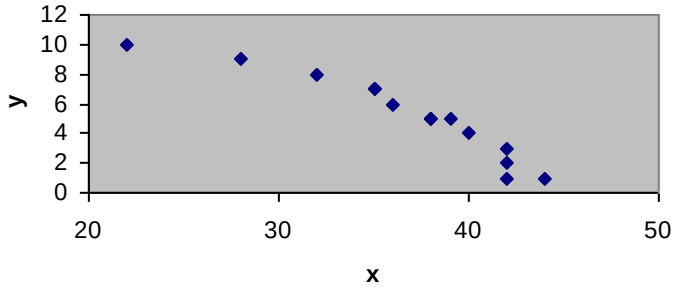
ANSWER: A scatter diagram

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



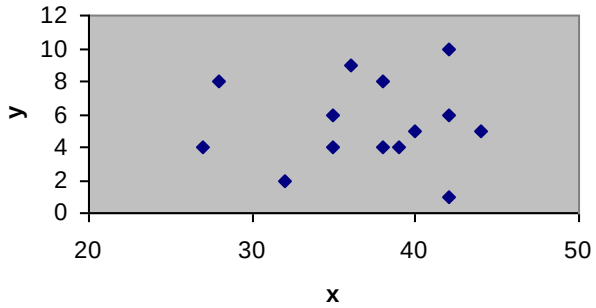
ANSWER: A positive relationship

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

32. It is time for Roger Hall, manager of new car sales at the Maxwell Ford dealership, to submit his order for new Mustang coupes. These cars will be parked in the lot, available for immediate sale to buyers who are not special-ordering a car. One of the decisions Roger must make is how many Mustangs of each color he should order. The new color options are very similar to the past year's options.
Roger believes that the colors chosen by customers who special-order their cars best reflect most customers' true color preferences. For that reason, he has taken a random sample of 40 special orders for Mustang coupes placed in the past year. The color preferences found in the sample are listed below.

Blue	Black	Green	White	Black	Red	Red	White
Black	Red	White	Blue	Blue	Green	Red	Black
Red	White	Blue	White	Red	Red	Black	Black
Green	Black	Red	Black	Blue	Black	White	Green
Blue	Red	Black	White	Black	Red	Black	Blue

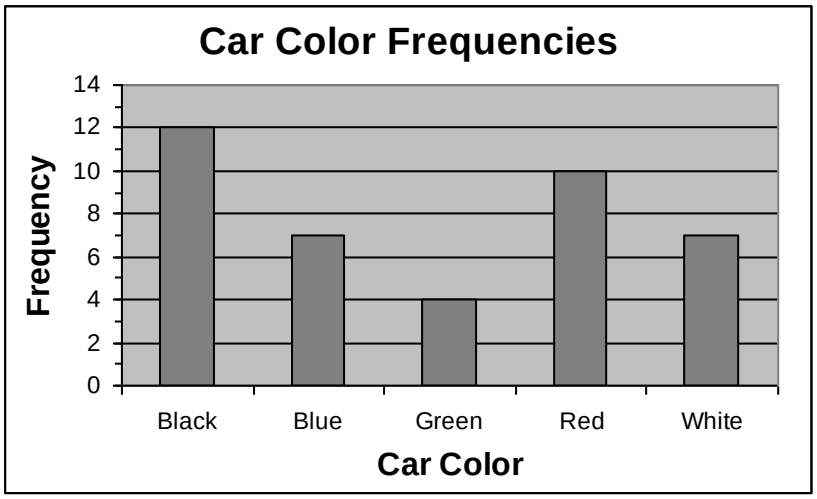
a. Prepare a frequency distribution, relative frequency distribution, and percent frequency distribution for the data set.
b. Construct a bar graph showing the frequency distribution of the car colors.
c. Construct a pie chart showing the percent frequency distribution of the car colors.

ANSWERS:

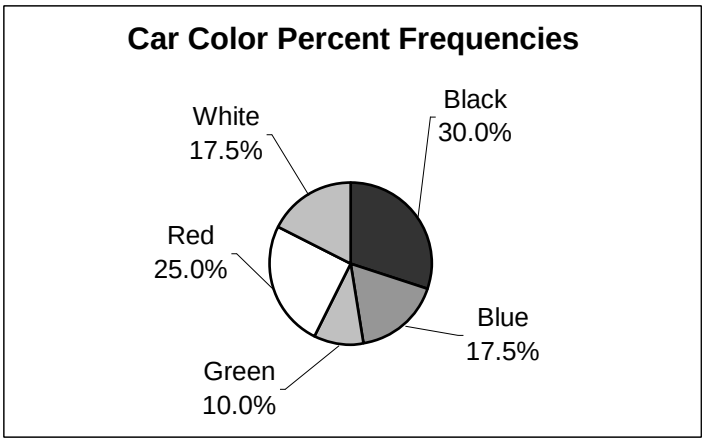
a.

Color of Car	Frequency	Relative Frequency	Percent Frequency
Black	12	0.300	30.0
Blue	7	0.175	17.5
Green	4	0.100	10.0
Red	10	0.250	25.0
White	7	0.175	17.5
Total	40	1.000	100.0

b.



c.



33. Missy Walters owns a mail-order business specializing in clothing, linens, and furniture for children. She is considering offering her customers a discount on shipping charges for furniture based on the dollar-amount of the furniture order. Before Missy decides the discount policy, she needs a better understanding of the dollar-amount distribution of the furniture orders she receives.
Missy had an assistant randomly select 50 recent orders that included furniture. The assistant recorded the value, to the nearest dollar, of the furniture portion of

each order. The data collected is listed below.

136	281	226	123	178	445	231	389	196	175
211	162	212	241	182	290	434	167	246	338
194	242	368	258	323	196	183	209	198	212
277	348	173	409	264	237	490	222	472	248
231	154	166	214	311	141	159	362	189	260

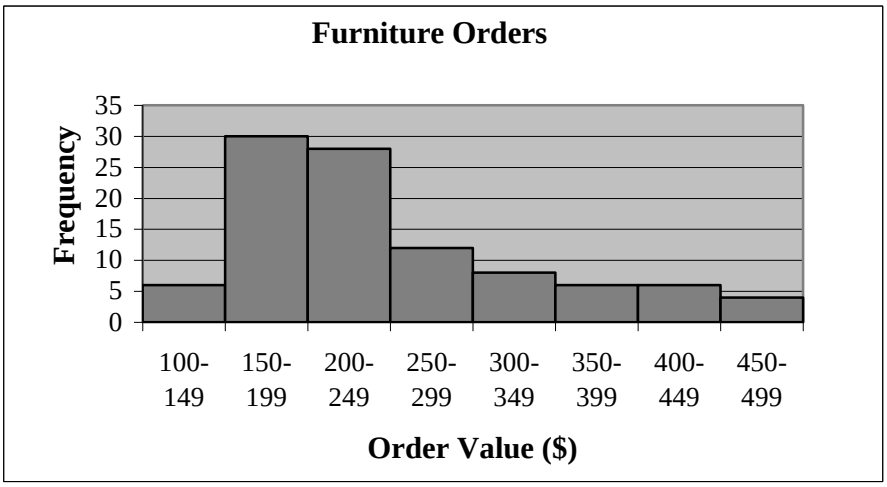
a. Prepare a frequency distribution, relative frequency distribution, and percent frequency distribution for the data set using a class width of $50.
b. Construct a histogram showing the percent frequency distribution of the furniture-order values in the sample.
c. Develop a cumulative frequency distribution and a cumulative percent frequency distribution for this data.

ANSWERS:

a.

Furniture Order	Frequency	Relative Frequency	Percent Frequency
100-149	3	0.06	6
150-199	15	0.30	30
200-249	14	0.28	28
250-299	6	0.12	12
300-349	4	0.08	8
350-399	3	0.06	6
400-449	3	0.06	6
450-499	2	0.04	4

b.



c.

Furniture Order	Frequency	Cumulative Frequency	Cumulative % Frequency
100-149	3	3	6

150-199	15	18	36
200-249	14	32	64
250-299	6	38	76
300-349	4	42	84
350-399	3	45	90
400-449	3	48	96
450-499	2	50	100

34. Develop a stretched stem-and-leaf display for the data set below, using a leaf unit of 10.

136	281	226	123	178	445	231	389	196	175
211	162	212	241	182	290	434	167	246	338
194	242	368	258	323	196	183	209	198	212
277	348	173	409	264	237	490	222	472	248
231	154	166	214	311	141	159	362	189	260

ANSWER:

Leaf Unit = 10

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