Chapter 4 – Evaluating and Displaying Data ***Answer Key***

4.1 Grouping Data

Answers

Quantitative (specific degree measure)
Qualitative (yes or no)
Quantitative (specific speed measure)
S with 5 occurrences
a. 0, 0, 1, 1, 1, 2, 2, 2, 3, 3, 3, 3, 3, 3, 4, 4, 4, 5, 6, 7 b. number 3 with 6 occurrences
a. Organize by ascending order b. 1, 1, 2, 2, 2, 3, 3, 3, 3, 3, 3, 3, 4, 4, 4, 5, 5, 5, 6, 6, 6, 7, 7, 8, 8, 8, 9, 9, 9, 9 c. 7, 3, and 2
a. 47 b. 18% c. 50
38
14
42%
22

Spinner #	Frequency
1	4
2	9
3	5
4	8
5	9
6	10
7	7

6
1
0, 0, 0, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4, 5, 5, 6, 9

Number of siblings	Frequency
0	3
1	6
2	8
3	5
4	4
5	2
6	1
7	0
8	0
9	1

30
26

4.2 Analyzing Data

Answers

Bar chart or pie chart

1. Pie chart
2. Bar chart
3. Bar chart
4. Scatter plot, bar chart,
5. A, b, d, e, f, g, h
6. A, b, c, e, f, g, h
7. D, f, g, h
8. C, e, f, h
9. C, e, f, g, h
10. C, e, f, h
11.

4.3 Relative Frequencies

Answers

1. 2/30 or 1/15
12. 9/30 or 3/10 or .3
13. 8/100 or 2/25 or .08
14. 30
15. 24/80 or 3/10 or .3
16. 18
17. Missing values, left to right, top to bottom: 5100 = 0.05, 15, 17100 = 0.17, 7, 1.00
18. 12%
19. 76%
20. 77%
21. 87
22. Quantitative (specific counts of players)
23. 61.95 – 63.95

4.4 Cumulative Frequencies

Answers

1.

Interval	Tally	Frequency
40-44	IIII	4
45-49	III	3
50-54	III	3
55-59	IIIIIII	8
60-64	IIIIII	6
65-69	II	2

2.

Interval	Tally	Frequency
50-59	IIIIII	6
60-69	II	2
70-79	IIII	4
80-89	IIIII	5
90-99	III	3

3.

Interval/Grades	Tally	Frequency
61-70	I	1
71-80	IIII	4
81-90	III	3
91-100	IIII	4

4. 11/15 = 73.33%

5.

Weight of Adults before diet program participation

Interval	Frequency	Cumulative Frequency
51-100	7	7
101-150	7	14
151-200	10	24
201-250	6	30

6. Cumulative frequencies top to bottom: 6, 9, 9, 12, 12, 14, 16

7.

Number of Meals Out

Interval	Tally	Frequency	Cumulative Frequency
0-1	III	3	3
2-3	IIIIII	6	9
4-5	IIIIIIII	8	17
6-7	III	3	20

8. 16

9. 7

10. The second one is correct:

Interval	Frequency
61-70	2
71-80	0
81-90	6

91-100 2

11. Cumulative frequencies, top to bottom: 20, 55, 70, 92, 100, 109
12. Frequencies, top to bottom: 20, 7, 4, 0, 6, 13
13. Should have 20 eggs in each interval under "frequency" and count by 20's from 20 – 120 from top to bottom under "cumulative"

4.5 Creating Histograms

Answers

1. Range is determined by subtracting the lowest value, 8.4 from the highest value, 11.4 = 3

24. 7-10 (a)

25. 8.4 – 8.8, 8.8-9.2, 9.2-9.6, 9.6-10.0, 10.0-10.4, 10.4 – 10.8, 10.8-11.2, 11.2-11.6

26.

27.

28.

29.

30.

31.

32. Missing frequencies, top to bottom: 0, 2, 6, 3, 4

33. 30 values ranging from 98 – 216. Intervals of 20lbs each is appropriate.

Weights	Frequency
98-117	11
118-137	1
138-157	3
158-177	2
178-197	7
198-217	6

34.

35.

Test Scores	Frequency
91-100	2
81-90	8
71-80	12
61-70	0
51-60	5
41-50	3

36. D

37.

38. 3

39. 36

4.6 Interpreting Histograms

Answers

1. Symmetric – Unimodal

40. Symmetric – Bimodal

41. Skewed Right

42. Skewed Left

43. Symmetric Unimodal, most children start to walk around the same age, so the distribution would be centered at about that age (18 mos).

44. Since rolling a die and coming up with 1, 2, 3, 4, 5, or 6 has the same probability, we would expect that after 1000 rolls, we would have a fairly even height distribution across the bars.

7.

a. = Cholesterol levels of 1000 adults. We would expect a few low and a few high numbers, but would expect most cholesterol levels in the middle or average range.
b. = Men's and Women's clothing sizes We will have two sets of data to graph and since they wear different sizes we would expect to see two peaks for each of these.
c. = Prices of Homes – it would be expected that a few homes worth millions would make this distribution skewed right.
d. = SAT Scores Doctors and engineers would be expected to be very good at math going in to take the SAT, so we would expect this distribution to be skewed left.

1. Shape: The distribution of ages is skewed right. The vast majority of the people who enjoy rollercoasters are younger while very few enjoy riding who are older.

45. Center: The data seem to be centered around 18 years old. Note that this implies that roughly half of those that enjoy riding rollercoasters are below the age of 18.

46. Spread: The data range from about 6 to about 60, so the approximate range equals 60-5 = 55.

47. Outliers: There are two outliers to the far right. (median = 16-20, Q3 = 21-25, Max IQR = 9, (9*1.5) + 25 = apx 39, right-side extremes > 51

48. Shape: Unimodal, left-skewed

49. Center: 60-70

50. Spread: 20-100, range = 80

51. Outliers: None apparent

4.7 Frequency Polygons – Probability and Statistics

Answers

1. The different values for each interval create the multiple "sides" of the overall shape.
2. It allows us to compare two sets of related data easily, on the same chart, and gives an additional indicator of the different rates of increase/decrease between intervals.
3.

Speed:	22-23	24-25	26-27	28-29	30-31	32-33	34-35
Weekday	IIII	IIIIIII	III	IIIII	IIIIII		
Weekend		II	IIIIII	IIII	IIIII	IIIII	III

4.

5. People drive faster on weekends
6. 25-30
7.

Class Interval	Midpoint	Frequency
10-19	14.5	III
20-29	24.5	IIII
30-39	34.5	IIIIIIIII
40-49	44.5	IIIII
50-59	54.5	IIIIII
60-69	64.5	III

8.

9.

Class Interval	Midpoint	Frequency
40-49	44.5	II
50-59	54.5	III
60-69	64.5	IIIIIII
70-79	74.5	IIIIIIIII
80-89	84.5	IIIII
90-99	94.5	III

10.

11.

Class Interval	Midpoint	Frequency

100-109	104.5	III
110-119	114.5	II
120-129	124.5	IIIIIIIII
130-139	134.5	IIIIII
140-149	144.5	IIII
150-159	154.5	III

12.

13.

Graphs appear the same, just different values on y-axis.

4.8 Creating Box-and-Whisker Plots

Answers

1. 11

52. 6

53. 13

54. 2

55. 18

56. Five Number Summary/Five statistic summary

57. Range = 18-2= 16

58. 75%

59. 25%

60. 50%

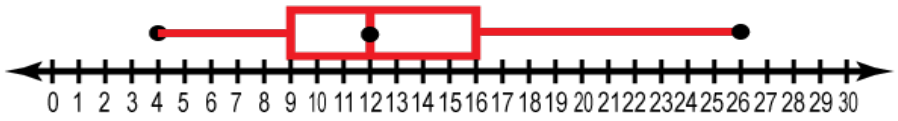
61. 25%

62. Range = 26 – 5 = 21

63. 9

64. 4, 10, 11, 14, 19 = Low extreme, Q1, med, Q3, high extreme

65.



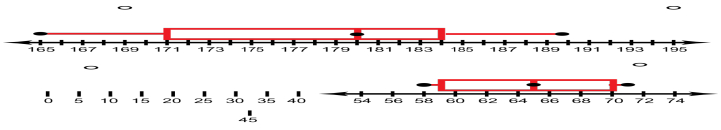
4.9 Interpreting Box-and-Whisker Plots

Answers

1. 20, 40, 50, 70, 85

66. 60, 65, 70, 74, 80

67.



68. Boys, median of boys is Q3 of girls, etc.

69. 102

70. 75

71. 88

72. 25

73. Below because of the nearly extreme outlier.

74. Cannot tell, or at least 1

75. 25%

76. Lower, due to a greater stretch on low end.

77. 75%

78. 60-110

79. Time getting ready for party, more than 25% (exactly 25% take more than 1hr to get ready for school)

80. True

81. Cannot Determine

82. True

83. Cannot Determine

84. True

85. True

86. False

87. Cannot Determine

88. True

4.10 Creating Stem and Leaf Diagrams

Answers

STEM	LEAF
1	2 2 3 3 4 4 5 5 5 5
	5 5 6 6 6 6 6 6 7
	7 7 7 7 8 8 9 9
2	3 3 4 8
3	6
4	5 8

1. 34
2. 30 - 39
3. 10 – 19

STEM	LEAF
0	5 6
1	1 3 3 4
2	0 0 2 6

STEM	LEAF
0	5 6
1	1 3 4
2	0 0 2 6

STEM	LEAF
0	9
1	8 9
2	0 1 1 2 3 3 4 4 4 4 5 7 7 7 7 7 8 8 8 8 8 8 9
3	0 0 1

STEM	LEAF
1 (0)	0
1 (5)	9
2 (0)	0
2 (5)	8 9
3 (0)	0 1 1 2 3 3 4 4 4 4
3 (5)	5 7 7 7 7 7 8 8 8 8 8 8 9
4 (0)	0 0 1

8. It shows a clearer distribution of the number of laps he does on a daily basis.

9. The whole numbers will be represented by the stem, and the decimal parts will be represented by the leaf

10. The data range is 56.2 – 62.6. The stem will start with 56 and go to 62.

STEM	LEAF
56	2
57	
58	5 5 8

58 3 3 8
59 0 1 1 2 9
60 1 3 3 4 8 8 9
61 0 3 3 5 5 6 8 8 8
62 0 1 2 6
63
64
65 6

12. 56.2, and 65.6

13. Manny:

Leaf Successful Attempts	STEM	Leaf Failed Attempts
	1	6 6
8 3 3	2	3
	3	
4		
0		

14. Jose

Leaf Successful Attempts	STEM	Leaf Failed Attempts
6 1	1	
1 0	2	6 8
	3	

15. Jose, he is a more successful short range kicker, where Manny is a better choice of long distances.

4.11 Interpreting Stem-and-Leaf Plots

Answers

1. False – There is always an average

89. False – All the numbers may be the same, or the same number of numbers may occur.

90. False – sometimes you may have to take the average of two numbers

91. 68 inches or 5’8”

92. 11 people went crawdad hunting who actually caught crawdads

93. 201 crawdads were enjoyed for dinner

94. 909

95. 891

96. 6 + 7 + 5 +4 = 22 students

97. 8 + 6 +2 +2 = 18 students

98. Minimum = 40, maximum = 95

99. Minimum = 41, maximum 91

100Section 1

101Section 2

102Period 1 is skewed up, and Period 2 is skewed down. There are no extreme outliers.

4.12 Creating Scatter Plots and Line Graphs

Answers

1.

1. – 3.

4. y = -1.25x + 0.4 (anything close is fine, it is an *estimated* line of fit)

5 - 6

7. y = 6.3x + 57 (or something similar)
8. 6.3 (7) + 57 = 101.1% or 100% (perfect score)
9. No, grades have a maximum of 100%
10.

11. Negative correlation
12. (on graph) Equation is: y = -5.3x + 10660 (or something similar)

13.

14. y = 1.2x + 22 (apx)
15. y = 1.2 (13) + 22 = 37.6

4.13 Interpreting Scatter Plots and Line Graphs

Answers

1. In the scatter plot, weight of a person is increasing along with his age. Positive trend is the one in which, if one set of values increases, the other set also tends to increase. So, the scatter plot follows a positive trend.

103 The income of the dealer in 2000, which is $50000 was the maximum.

104 Plot 1 is the appropriate scatter plot graph for the data.

105 The Scatter Plot shows a positive trend

106 The scatter plot shows a negative trend.

107.

108 It shows a positive trend

109 Graph 4

110 Graph 3

111 Graph 3 because it does not show any sort of trend.

112 Graph 2

113 Point A

114 Point D

115 Point B

15. Sentence should convey the fact that the student watched a lot of TV, and only worked for a short time on homework.

4.14 Creating Pie Charts

Answers

1. Sector

2. The entire circle

3. Largest Sector – M&M, Smallest – Snickers

4. Heath 151/601 25%
M&M 191/601 32%
Snickers 61/601 10%
Skittles 107/601 18%
Almond Joy 91/601 15%

5. Heath 25% 0f 360 90
M&M 32% of 360 115
Snickers 10% of 360 36
Skittles 18% of 360 65
Almond Joy 15% of 360 54

6.

7. Ford Motor
8. See Chart Below
9. See Chart Below

Company	Shares Owned	Percentage of Total Portfolio	Number of Degrees on a Pie Chart
Hostess	8	16%	58 (57.6)
Pepsi	11	22%	79 (79.2)
Dell	5	10%	36
Conoco	7	14%	50 (50.4)
Ford Motor	19	38%	137 (136.8

10.

Runs 1	4.1%
Reads 2	8.2%
Sleeps 9	37.5%
Eating 2	8.2%
Phone 1	4.1%
Family 4	16.7%
School 5	20.8%

12.

Savings:	120.00	
Car Expense:	240.00	
Groceries	240.00	
Clothes	120.00	
Mortgage	360.00	
Misc.	120.00	10%

13.

Movies	31.25	
Friends	187.50	
Clothes	250.00	
Books	30.25	6%

14.

Winter	16.8 inches
Spring	8.4
Summer/Fall	2.8

15.

Nature Preserve	16
Art Gallery	9
Symphony	8

Museum of Nature and Science 3

4.15 Interpreting Pie Charts

Answers

1. $27,000

11654deg

117$37.50

118$187.50

1195%

120Materials and advertising or shipping

121$21,825

122108 degrees = 30%, so Advertising or Shipping AND Printing or Binding

123Bonds

124Apx 2.5%

125$11490.60

12639deg

1271:3