STA2023 Test # 1
Study Guide

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the given value is a statistic or a parameter.

1) A sample of 120 employees of a company is selected, and the average age is found to be 37 years. 1) _____
   A) Parameter B) Statistic

2) After inspecting all of 55,000 kg of meat stored at the Wurst Sausage Company, it was found that 45,000 kg of the meat was spoiled. 2) _____
   A) Statistic B) Parameter

Solve the problem.

3) The amount of television viewed by today's youth is of primary concern to Parents Against Watching Television (PAWT). 250 parents of elementary school–aged children were asked to estimate the number of hours per week that their child watches television. Identify the type of data collected by PAWT. 3) _____
   A) qualitative B) quantitative

4) The manager of a car dealership records the colors of automobiles on a used car lot. Identify the type of data collected. 4) _____
   A) quantitative B) qualitative

5) A fan observes the numbers on the shirts of a girl's soccer team. Identify the type of data collected. 5) _____
   A) qualitative B) quantitative

6) An usher records the number of unoccupied seats in a movie theater during each viewing of a film. Identify the type of data collected. 6) _____
   A) qualitative B) quantitative

Determine whether the given value is from a discrete or continuous data set.

7) The number of freshmen entering college in a certain year is 621. 7) _____
   A) Discrete B) Continuous

8) The weight of Bill's pack as he sets off on a backpacking trip is 48.3 lb. 8) _____
   A) Continuous B) Discrete

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Identify the sample and population. Also, determine whether the sample is likely to be representative of the population.

9) In a poll of 50,000 randomly selected college students, 74% answered "yes" when asked "Do you have a television in your dorm room?". 9) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the given description corresponds to an observational study or an experiment.

10) A marketing firm does a survey to find out how many people use a product. Of the one hundred people contacted, fifteen said they use the product. 10) _____
A) Experiment B) Observational study

11) A quality control specialist compares the output from a machine with a new lubricant to the output of machines with the old lubricant. 11) _____
A) Observational study B) Experiment

12) A T.V. show's executives raised the fee for commercials following a report that the show received a "No. 1" rating in a survey of viewers. 12) _____
A) Observational study B) Experiment

Identify which of these types of sampling is used: random, stratified, systematic, cluster, convenience.

13) 49, 34, and 48 students are selected from the Sophomore, Junior, and Senior classes with 496, 348, and 481 students respectively. 13) _____
A) Cluster
B) Systematic
C) Convenience
D) Stratified
E) Random

14) A sample consists of every 49th student from a group of 496 students. 14) _____
A) Random
B) Stratified
C) Cluster
D) Convenience
E) Systematic

15) A pollster uses a computer to generate 500 random numbers, then interviews the voters corresponding to those numbers. 15) _____
A) Random
B) Stratified
C) Cluster
D) Convenience
E) Systematic

16) To avoid working late, a quality control analyst simply inspects the first 100 items produced in a day. 16) _____
A) Random
B) Cluster
C) Convenience
D) Systematic
E) Stratified

17) An education researcher randomly selects 48 middle schools and interviews all the teachers at each school. 17) _____

A) Random
B) Convenience
C) Systematic
D) Cluster
E) Stratified

Provide an appropriate response.

18) The following frequency distribution analyzes the scores on a math test. Find the class boundaries of scores interval 40–59. 18) _____

Scores	Number of students
40–59	2
60–75	4
76–82	6
83–94	15
95–99	5

A) 40.5, 58.5 B) 39.5, 58.5 C) 39.5, 59.5 D) 40.5, 59.5

19) The following frequency distribution analyzes the scores on a math test. Find the class midpoint of scores interval 40–59. 19) _____

Scores	Number of students
40–59	2
60–75	4
76–82	6
83–94	15
95–99	5

A) 49.5 B) 49.0 C) 50.5 D) 48.5

20) The frequency distribution below summarizes employee years of service for Alpha Corporation. Determine the width of each class. 20) _____

Years of service	Frequency
1–5	5
6–10	20
11–15	25
16–20	10
21–25	5
26–30	3

A) 6 B) 10 C) 5 D) 4

Solve the problem.

21) What number is missing from the table? 21) _____

Grades on Test	Frequency	Relative Frequency
A	6	.24
B	7	
C	9	.36
D	2	.08
F	1	.04

A) .07 B) .72 C) .28 D) .70

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

22) Complete the frequency table for the data shown below. 22) _____

green	blue	brown	orange	blue
brown	orange	blue	red	green
blue	brown	green	red	brown
blue	brown	blue	blue	red

Color	Frequency
Green	
Blue	
Brown	
Orange	

23) The data below show the types of medals won by athletes representing the United States in the Winter Olympics. 23) _____

gold	gold	silver	gold	bronze	silver	silver
bronze	gold	silver	silver	bronze	silver	gold
gold	silver	silver	bronze	bronze	gold	silver
gold	gold	bronze	bronze			

a. Construct a frequency table for the data.
b. Construct a relative frequency table for the data.
c. Construct a frequency bar graph for the data.

Use the given data to construct a frequency distribution.

24) A medical research team studied the ages of patients who had strokes caused by stress. 24) _____

The ages of 34 patients who suffered stress strokes were as follows.

29 30 36 41 45 50 57 61 28 50 36 58
60 38 36 47 40 32 58 46 61 40 55 32
61 56 45 46 62 36 38 40 50 27

Construct a frequency distribution for these ages. Use 8 classes beginning with a lower class limit of 25.

Age	Frequency

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Provide an appropriate response.

25) The frequency distribution for the weekly incomes of students with part–time jobs is given below. 25) _____

Construct the corresponding relative frequency distribution. Round relative frequencies to the nearest hundredth of a percent if necessary.

Income ($)	Frequency
200–300	55
301–400	70
401–500	73
501–600	68
More than 600	10

A)

Income ($)	Relative Frequency
200–300	25.98%
301–400	24.91%
401–500	3.65%
501–600	19.64%
More than 600	26.07%

B)

Income ($)	Relative Frequency
201–300	15.5%
301–400	22.1%
401–500	31.3%
501–600	16.2%
More than600	14.9%

C)

Income ($)	Relative Frequency
200–300	19.93%
301–400	25.36%
401–500	26.45%
501–600	24.64%
More than 600	3.62%

D)

Income ($)	Relative Frequency
200–300	12.5%
301–400	20.1%
401–500	37.3%
501–600	15.2%
More than 600	14.9%

Construct the cumulative frequency distribution that corresponds to the given frequency distribution.

26) 26) _____

Speed	Number of cars
0–29	4
30–59	16
60–89	60
90–119	20

A)

Speed	Cumulative Frequency
Less than 30	100
Less than 60	80
Less than 90	82
Less than120	4

B)

Speed	Cumulative Frequency
Less than 30	0.04
Less than 60	0.20
Less than 90	0.80
Less than120	1.00

C)

Speed	Cumulative Frequency
0–29	4
30–59	20
60–89	80
90–119	100

D)

Speed	Cumulative Frequency
Less than 30	4
Less than 60	20
Less than 90	80
Less than120	100

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

27) The data show the total number of medals (gold, silver, and bronze) won by each country winning at least one gold medal in the Winter Olympics. 27) _____

1 2 3 3 4 9 9 11 11

11 14 14 19 22 23 24 25 29

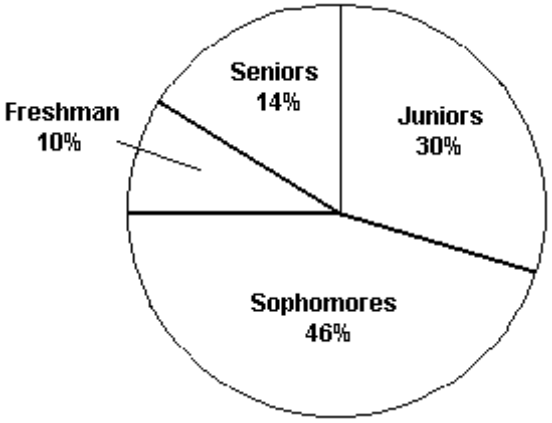
a. Complete the class frequency table for the data.

Total Medals	Frequency
1–5	
6–10	
11–15	
16–20	
21–25	
26–30	

b. Using the classes from the frequency table, construct a histogram for the data.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

28) 28) _____



The pie chart shows the classifications of students in a statistics class.

What percentage of the class consists of freshman, sophomores, and juniors?

A) 54% B) 86% C) 44% D) 14%

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

29) The table shows the number of each type of car sold in June. 29) _____

Car	Number
compact	7,204
sedan	9,089
small SUV	20,418
large SUV	13,691
minivan	15,837
truck	15,350
Total	81,589

a. Construct a relative frequency table for the car sales.

b. Construct a Pareto diagram for the car sales using the class percentages as the heights of the bars.

30) The scores for a statistics test are as follows: 30) _____

87 76 91 77 94 96 88 85 66 89
79 97 50 99 83 88 82 53 18 69

Create a stem-and-leaf display for the data.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use the data to create a stemplot.

31) The following data show the number of laps run by each participant in a marathon. 31) _____

46 65 55 43 51 48 57 30 43 49 32 56

A)

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

B)

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

32) The following data consists of the weights (in pounds) of 15 randomly selected women and the weights of 15 randomly selected men. Construct a back-to-back stemplot for the data. 32) _____

Women: 128 150 118 166 142
122 137 110 175 152
145 126 139 111 170

Men: 140 153 199 186 169
136 176 162 196 155
173 190 141 166 153

A)

Men		Women
	11	0 1 8
	12	2 6 8
6	13	7 9
1 0	14	2 5
5 3 3	15	0 2
9 6 2	16	6
6 3	17	0 5
6	18	
9 6 0	19	

B)

Men		Women
	11	0 1
	12	2 6 8
6	13	7 9
1 0	14	2 5
5 3 3	15	0 2 4
9 6 2	16	6
6 3	17	0 5
9 6	18	
9 6	19	

Find the mean for the given sample data. Unless indicated otherwise, round your answer to one more decimal place than is present in the original data values.

33) Andrew asked seven of his friends how many cousins they had. The results are listed below. Find the mean number of cousins. 33) _____

15 12 5 14 4 4 6

A) 10 cousins B) 10.1 cousins C) 8.1 cousins D) 8.6 cousins

34) Last year, nine employees of an electronics company retired. Their ages at retirement are listed below. Find the mean retirement age. 34) _____

56 65 62
53 68 58
65 52 56

A) 58.2 yr B) 59.4 yr C) 58.8 yr D) 58.0 yr

35) Listed below are the amounts of time (in months) that the employees of a restaurant have been working at the restaurant. Find the mean. 35) _____

1 5 6 8 11 14 17 46 61 90 99 126 143 167

A) 31.5 months B) 56.7 months C) 61.1 months D) 52.9 months

Find the median for the given sample data.

36) The temperatures (in degrees Fahrenheit) in 7 different cities on New Year's Day are listed below. 36) _____

25 25 31 53 64 73 83

Find the median temperature.

A) 53°F B) 51°F C) 64°F D) 31°F

37) The number of vehicles passing through a bank drive-up line during each 15-minute period was recorded. The results are shown below. Find the median number of vehicles going through the line in a fifteen-minute period. 37) _____

25 27 25 28
28 25 30 27
35 31 31 29
24 31 25 20
15 27 27 27

A) 26.85 vehicles B) 27 vehicles
C) 31 vehicles D) 28 vehicles

Find the mode(s) for the given sample data.

38) 20 42 46 42 49 42 49 38) _____

A) 49 B) 46 C) 42 D) 41.4

39) 7.35 7.41 7.56 7.35 7.88 7.99 7.62 39) _____

A) 7.41 B) 7.35 C) 7.594 D) 7.56

40) Last year, nine employees of an electronics company retired. Their ages at retirement are listed below. 40) _____

51 61 62 57 50 67 68 58 53

A) 58 yr
B) 51 yr, 61 yr, 62 yr, 57 yr, 50 yr, 67 yr, 68 yr, 58 yr, 53 yr
C) 58.6 yr
D) no mode

Find the midrange for the given sample data.

41) 3 6 9 0 4 1 11 5 9 14 3 8 2 15 0 9 41) _____

A) 7.5 B) 5.5 C) 15 D) 8

42) Listed below are the amounts of time (in months) that the employees of an electronics company have been working at the company. Find the midrange. 42) _____

11 21 29 35 49 57 61 61 71 76 85 93 132 142

A) 61 months B) 65.9 months C) 76.5 months D) 65.5 months

Find the range for the given sample data.

43) Rich Borne teaches Chemistry 101. Last week he gave his students a quiz. Their scores are listed below. 43) _____

24 31 47 29 31 16 48 41 50 54 37 22

A) 16 B) 54 C) 38 D) 7

44) The prices (in dollars) of 12 electric smoothtop ranges are listed below. 44) _____

865 1010 655 565 1465 1110
710 765 820 1310 555 1065

A) $930 B) $920 C) $900 D) $910

Find the variance for the given data. Round your answer to one more decimal place than the original data.

45) The weights (in ounces) of 10 cookies are shown. 45) _____

1.4 0.99 1.37 0.58 0.68
0.57 1.1 0.96 1.2 1.27

A) 0.074 oz^2 B) 0.08 oz^2 C) 0.098 oz^2 D) 0.088 oz^2

46) A class of sixth grade students kept accurate records on the amount of time they spent playing video games during a one-week period. The times (in hours) are listed below: 46) _____

30.9 28.0 23.9 15.8 26.5
15.3 12.7 14.6 25.6 10.4

A) 215.45 hr^2 B) 53.84 hr^2 C) 48.46 hr^2 D) 53.74 hr^2

Find the standard deviation for the given sample data. Round your answer to one more decimal place than is present in the original data.

47) The top nine scores on the organic chemistry midterm are as follows. 47) _____

47, 55, 71, 41, 82, 57, 25, 66, 81

A) 17.8 B) 7.3 C) 20.2 D) 18.9

48) Listed below are the amounts of time (in months) that the employees of a restaurant have been working at the restaurant. 48) _____

2 3 6 17 22 40 54 73 101 122

A) 41.5 months B) 42.7 months C) 40.5 months D) 43.9 months

Use the range rule of thumb to estimate the standard deviation. Round results to the nearest tenth.

49) The heights in feet of people who work in an office are as follows. 49) _____

5.8 5.9 6.1 5.4 6.0 5.8 5.9 6.2 5.7 5.8

A) 0.5 B) 0.1 C) 0.2 D) 1.2

Use the empirical rule to solve the problem.

50) The systolic blood pressure of 18-year-old women is normally distributed with a mean of 120 mmHg and a standard deviation of 12 mmHg. What percentage of 18-year-old women have a systolic blood pressure between 96 mmHg and 144 mmHg? 50) _____

A) 68% B) 99.99% C) 99.7% D) 95%

51) The amount of Jen's monthly phone bill is normally distributed with a mean of $55 and a standard deviation of $12. What percentage of her phone bills are between $19 and $91? 51) _____

A) 68% B) 95% C) 99.7% D) 99.99%

Solve the problem. Round results to the nearest hundredth.

52) Scores on a test have a mean of 66 and a standard deviation of 9. Michelle has a score of 57. Convert Michelle's score to a z-score. 52) _____

A) 1 B) -9 C) 9 D) -1

53) The mean of a set of data is −2.91 and its standard deviation is 3.88. Find the z score for a value of 2.80. 53) _____

A) 1.77 B) 1.62 C) 1.32 D) 1.47

Find the number of standard deviations from the mean. Round your answer to two decimal places.

54) The annual snowfall in a town has a mean of 35 inches and a standard deviation of 11 inches. Last year there were 60 inches of snow. How many standard deviations from the mean is that? 54) _____

A) 0.40 standard deviations below the mean
B) 2.27 standard deviations below the mean
C) 0.40 standard deviations above the mean
D) 2.27 standard deviations above the mean

55) Mario's weekly poker winnings have a mean of $353 and a standard deviation of $67. Last week he won $185. How many standard deviations from the mean is that? 55) _____

A) 2.51 standard deviations above the mean
B) 1.25 standard deviations below the mean
C) 1.25 standard deviations above the mean
D) 2.51 standard deviations below the mean

Find the z−score corresponding to the given value and use the z−score to determine whether the value is unusual. Consider a score to be unusual if its z−score is less than −2.00 or greater than 2.00. Round the z−score to the nearest tenth if necessary.

56) A test score of 48.4 on a test having a mean of 66 and a standard deviation of 11. 56) _____

A) −1.6; not unusual B) −1.6; unusual
C) −17.6; unusual D) 1.6; not unusual

57) A weight of 224 pounds among a population having a mean weight of 158 pounds and a standard deviation of 23.5 pounds. 57) _____

A) 2.8; unusual B) −2.8; not unusual
C) 2.8; not unusual D) 65.8; unusual

Determine which score corresponds to the higher relative position.

58) Which is better, a score of 92 on a test with a mean of 71 and a standard deviation of 15, or a score of 688 on a test with a mean of 493 and a standard deviation of 150? 58) _____

A) Both scores have the same relative position.
B) A score of 92
C) A score of 688

Find the percentile for the data value.

59) Data set: 52 31 47 69 73 71 30; 59) _____
data value: 52

A) 50 B) 57 C) 43 D) 20

60) Data set: 12 18 42 24 12 30 54 54 66 18 18 54 36 6 54; 60) _____
data value: 42

A) 52 B) 60 C) 35 D) 70

Find the indicated measure.

61) Use the given sample data to find Q_3. 61) _____

49 52 52 52 74 67 55 55

A) 61.0 B) 55.0 C) 6.0 D) 67.0

62) The weights (in pounds) of 30 newborn babies are listed below. Find P_{16}. 62) _____

5.5 5.7 5.8 5.9 6.1 6.1 6.4 6.4 6.5 6.6
6.7 6.7 6.7 6.9 7.0 7.0 7.0 7.1 7.2 7.2
7.4 7.5 7.7 7.7 7.8 8.0 8.1 8.1 8.3 8.7

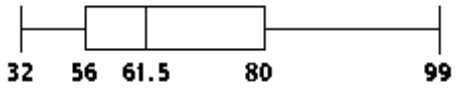
A) 6.0 lb B) 5.9 lb C) 4.8 lb D) 6.1 lb

Construct a boxplot for the given data. Include values of the 5–number summary in all boxplots.

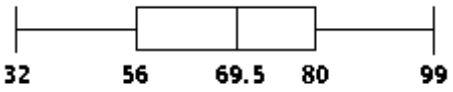
63) The test scores of 32 students are listed below. Construct a boxplot for the data set. 63) _____

32 37 41 44 46 48 53 55
57 57 59 63 65 66 68 69
70 71 74 74 75 77 78 79
81 82 83 86 89 92 95 99

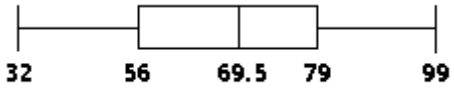
A)



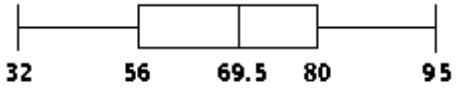
B)



C)



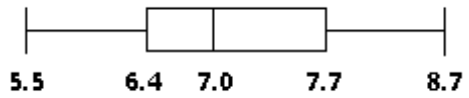
D)



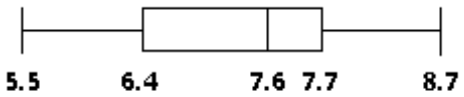
64) The weights (in pounds) of 30 newborn babies are listed below. Construct a boxplot for the data set. 64) _____

5.5 5.7 5.8 5.9 6.1 6.1 6.3 6.4 6.5 6.6
6.7 6.7 6.7 6.9 7.0 7.0 7.0 7.1 7.2 7.2
7.4 7.5 7.7 7.7 7.8 8.0 8.1 8.1 8.3 8.7

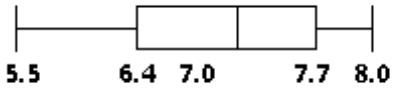
A)



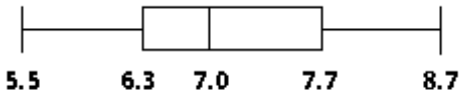
B)



C)



D)

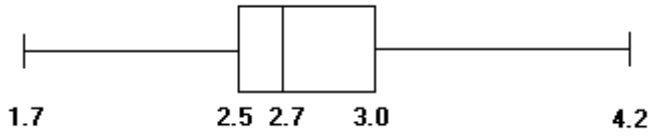


Construct a modified boxplot for the data. Identify any outliers.

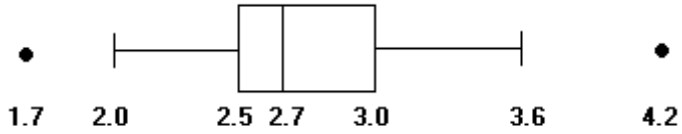
65) The weights (in ounces) of 27 tomatoes are listed below. 65) _____

1.7	2.0	2.2	2.2	2.4	2.5	2.5	2.5	2.6
2.6	2.6	2.7	2.7	2.7	2.8	2.8	2.8	2.9
2.9	2.9	3.0	3.0	3.1	3.1	3.3	3.6	4.2

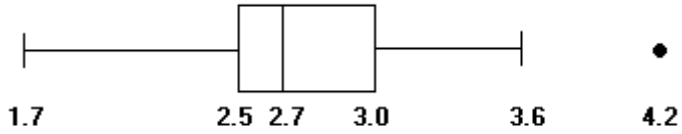
A) No outliers



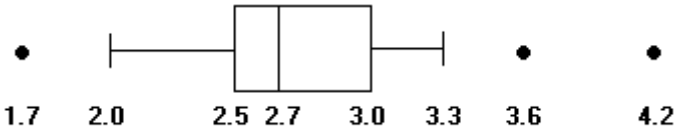
B) Outliers: 1.7 oz, 4.2 oz



C) Outlier: 4.2 oz



D) Outliers: 1.7 oz, 3.6 oz, 4.2 oz



1) B
2) B
3) B
4) B
5) A
6) B
7) A
8) A
9) Sample: the 50,000 selected college students; population: all college students; representative
10) B
11) B
12) A
13) D
14) E
15) A
16) C
17) D
18) C
19) A
20) C
21) C
22)

Color	Frequency
Green	3
Blue	7
Brown	5
Orange	2
Red	3

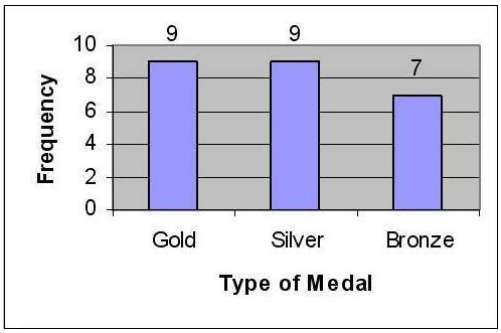
23) a.

Medal	Frequency
Gold	9
Silver	9
Bronze	7

b.

Medal	Relative Frequency
Gold	.36
Silver	.36
Bronze	.28

c.



24)

Age	Frequency
25–29	3
30–34	3
35–39	6
40–44	4
45–49	5
50–54	3
55–59	5
60–64	5

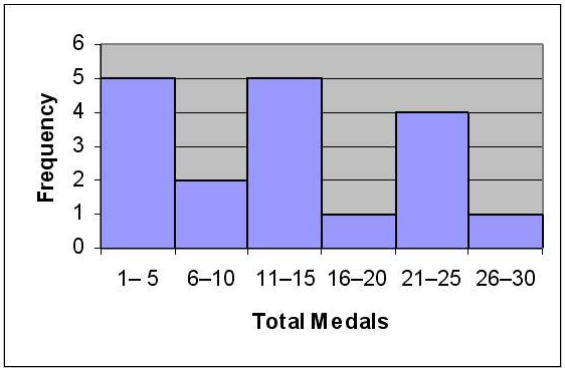
25) C

26) D

27) a.

Total Medals	Frequency
1–5	5
6–10	2
11–15	5
16–20	1
21–25	4
26–30	1

b.

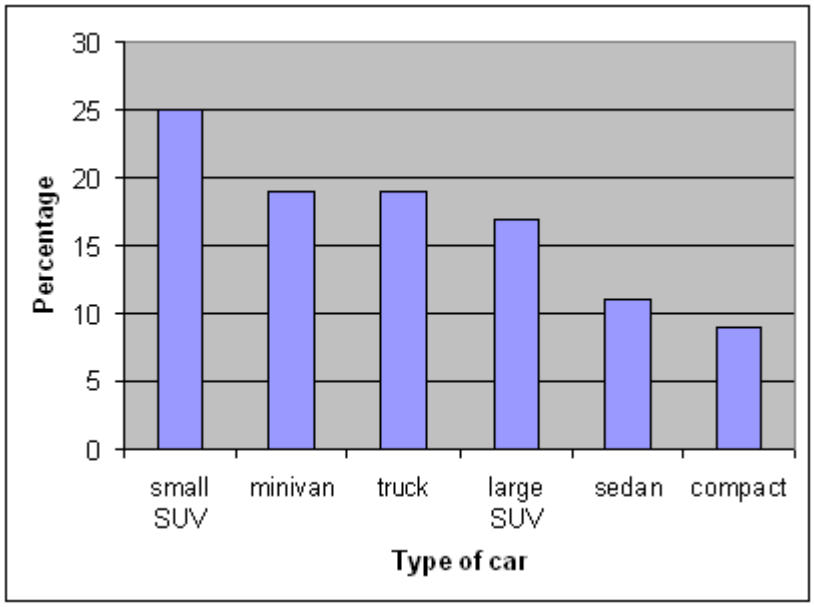


28) B

29) a.

Car	Relative Frequency
compact	0.09
sedan	0.11
small SUV	0.25
large SUV	0.17
minivan	0.19
truck	0.19

b.



30)

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

31) B
32) A
33) D
34) B
35) B
36) A
37) B
38) C

39) B
40) D
41) A
42) C
43) C
44) D
45) C
46) B
47) D
48) B
49) C
50) D
51) C
52) D
53) D
54) D
55) D
56) A
57) A
58) B
59) C
60) B
61) A
62) D
63) B
64) A
65) B