MATH 103/GRACEY Name_____
PRACTICE EXAM/CHAPTERS 2-3

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

Provide an appropriate response.

1) The frequency distribution below summarizes employee years of service for Alpha Corporation. Determine the width of each class. 1) _____

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

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

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

Solve the problem.

2) Using a strict interpretation of the relevant criteria characterizing a normal distribution,does the frequency distribution below appear to have a normal distribution? Does the distribution appear to be normal if the criteria are interpreted very loosely? 2) _____

Closing Share Price	Frequency
0-5	2
6-10	5
11-15	16
16-20	28

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

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

3) 3) _____

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

A)

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

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	100
Less than 60	80
Less than 90	82
Less than120	4

Provide an appropriate response.

4) The frequency distribution for the weekly incomes of students with part-time jobs is given below. Construct the corresponding relative frequency distribution. Round relative frequencies to the nearest hundredth of a percent if necessary. 4) _____

Income ($)	Frequency
200-300	68
301-400	69
401-500	79
501-600	87
More than 600	11

A)

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

B)

Income ($)	Relative Frequency
200-300	24.76%
301-400	27.97%
401-500	3.53%
501-600	21.38%
More than 600	24.84%

C)

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

D)

Income ($)	Relative Frequency
200-300	21.66%
301-400	21.97%
401-500	25.16%
501-600	27.71%
More than 600	3.50%

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

Use the given data to construct a frequency distribution.

5) A medical research team studied the ages of patients who had strokes caused by stress. The ages of 34 patients who suffered stress strokes were as follows. 5) _____

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

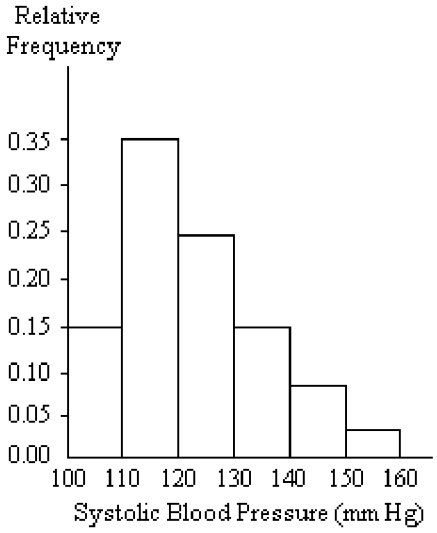
Construct a frequency distribution for these ages. Use 8 classes beginning with a lower class limit of 25.

Age	Frequency

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

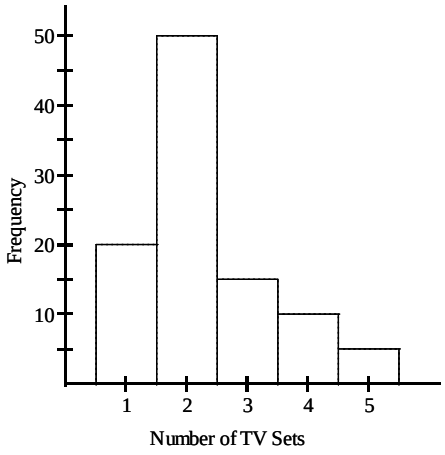
Provide an appropriate response.

6) A nurse measured the blood pressure of each person who visited her clinic. Following is a relative-frequency histogram for the systolic blood pressure readings for those people aged between 25 and 40. The blood pressure readings were given to the nearest whole number. Approximately what percentage of the people aged 25-40 had a systolic blood pressure reading between 110 and 139 inclusive? 6) _____



A) 59% B) 39% C) 75% D) 89%

7) The histogram below represents the number of television sets per household for a sample of U.S. households. How many households are included in the histogram? 7) _____



A) 110 B) 95 C) 90 D) 100

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

8) In a survey, 26 voters were asked their ages. The results are shown below. Construct a histogram to represent the data (with 5 classes beginning with a lower class limit of 19.5 and a class width of 10). What is the approximate age at the center? 8) _____

43 56 28 63 67 66 52 48 37 51 40 60 62
66 45 21 35 49 32 53 61 53 69 31 48 59

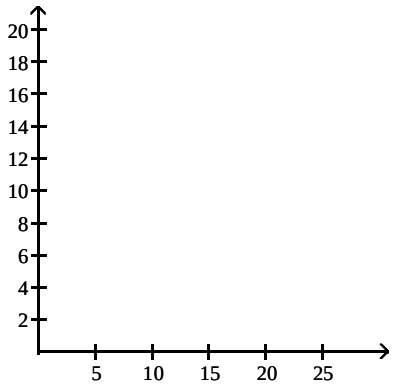
9) Suppose that you construct a histogram and a relative frequency histogram corresponding to a particular frequency table. In what ways will the two histograms be similar? In what ways will they differ? 9) _____

Solve the problem.

10) The frequency table below shows the amount of weight loss during the first month of a diet program for both males and females. Compare the results by constructing two frequency polygons on the same axes, and determine whether there appears to be a significant difference between the two genders. 10) _____

Weight (lb)	Frequency (males)
5-7	2
8-10	9
11-13	18
14-16	13
17-19	4
20-22	1

Weight (lb)	Frequency (females)
5-7	4
8-10	3
11-13	19
14-16	5
17-19	15
20-22	1

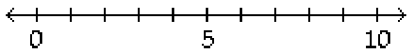


MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

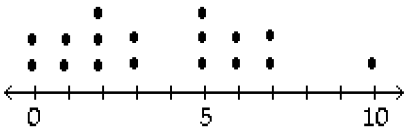
Construct the dotplot for the given data.

11) Attendance records at a school show the number of days each student was absent during the year. The days absent for each student were as follows. 11) _____

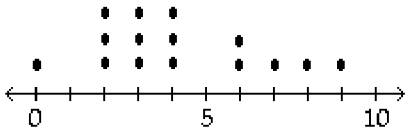
0 2 3 4 2 3 4 6 7 2 3 4 6 9 8



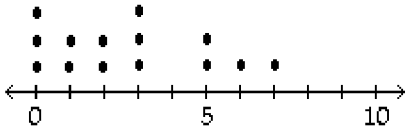
A)



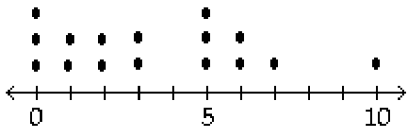
B)



C)



D)



Use the data to create a stemplot.

12) The attendance counts for this season's basketball games are listed below. 12) _____

227 239 215 219
221 233 229 233
235 228 245 231

A)

21	5 9
22	1 7 8 9
23	1 3 3 5 9
24	5

B)

21	5 7 9
22	1 8 9
23	1 3 3 5 9
24	5

13) 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. 13) _____

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
	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	

B)

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	

Find the original data from the stemplot.

14) 14) _____

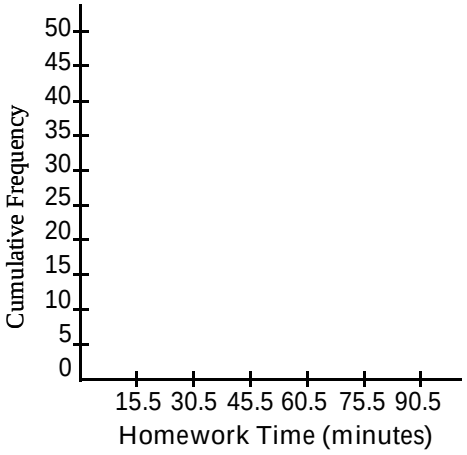
Stem	Leaves
6	5 8
7	1 8
8	5 5

A) 61, 65, 61, 78, 88, 85
B) 65, 61, 68, 71, 81, 85
C) 65, 68, 71, 71, 85, 85
D) 65, 68, 71, 78, 85, 85

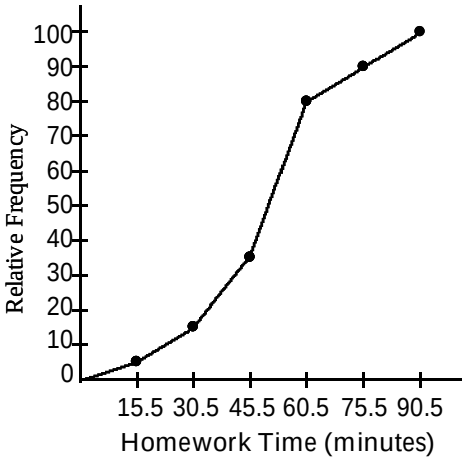
Provide an appropriate response.

15) The table contains data from a study of daily study time for 40 students from Statistics 101. Construct an ogive from the data. 15) _____

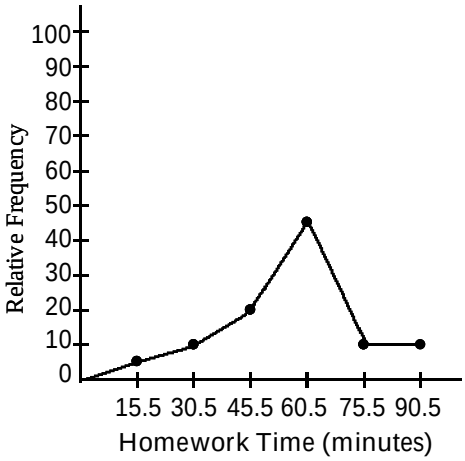
Minutes on homework	Number of students	Relative frequency	Cumulative frequency
0-15	2	0.05	2
16-30	4	0.10	6
31-45	8	0.20	14
46-60	18	0.45	32
61-75	4	0.10	36
76-90	4	0.10	40



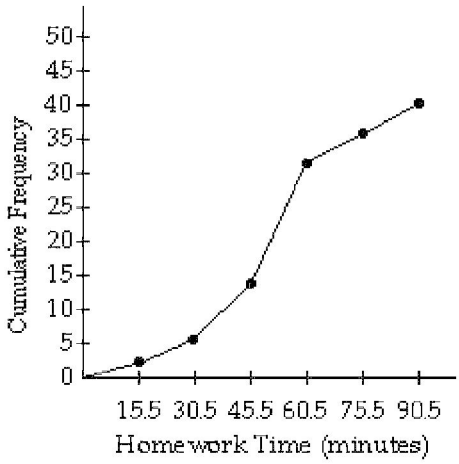
A)



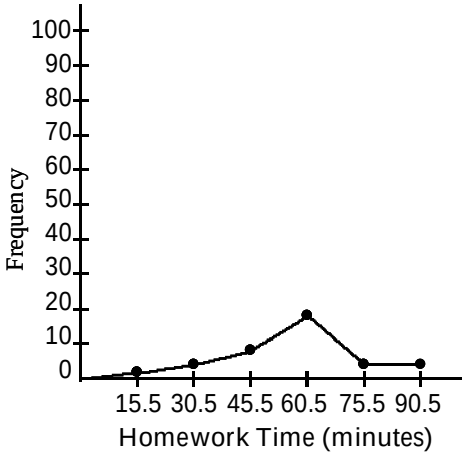
B)



C)

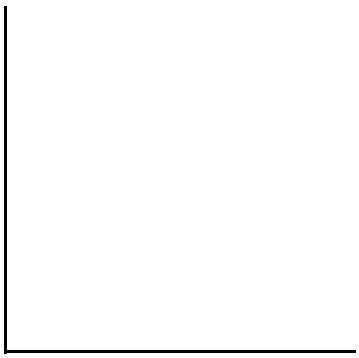


D)

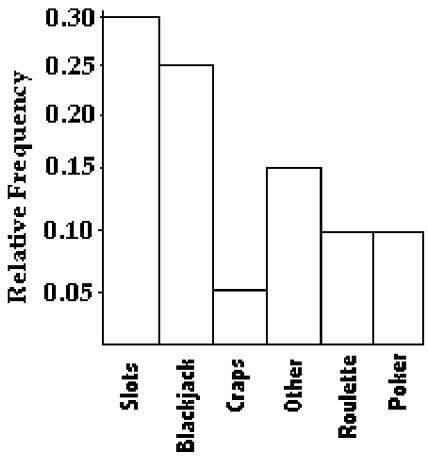


Solve the problem.

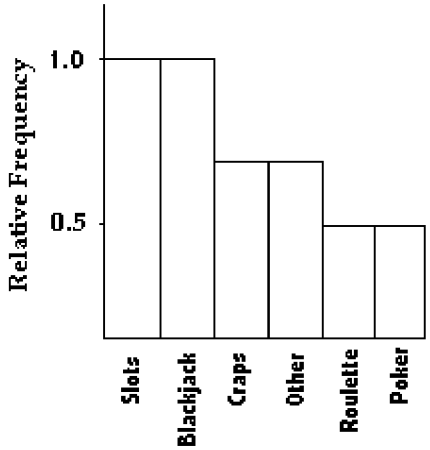
16) 240 casino patrons, were interviewed as they left the casino. 72 of them said they spent most of the time playing the slots. 72 of them said they played blackjack. 36 said they played craps. 12 said roulette. 12 said poker. The rest were not sure what they played the most. Construct a Pareto chart to depict the gaming practices of the group of casino goers. Choose the vertical scale so that the relative frequencies are represented. 16) _____



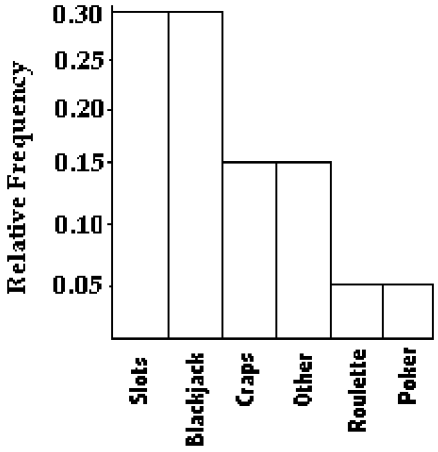
A)



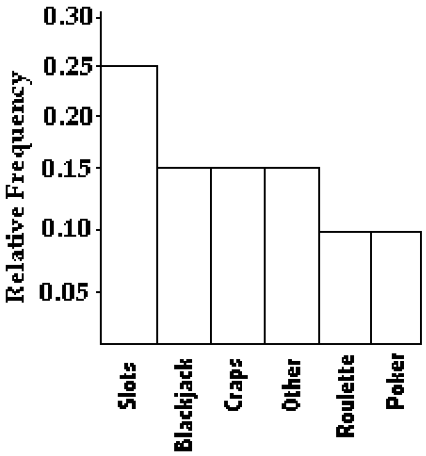
B)



C)

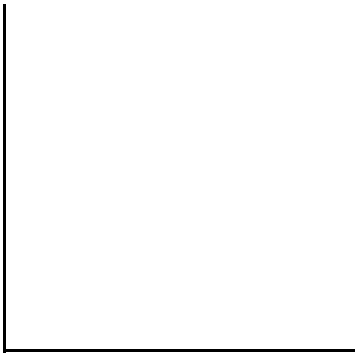


D)



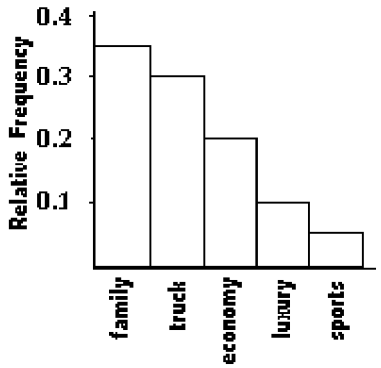
17) A car dealer is deciding what kinds of vehicles he should order from the factory. He looks at his sales report for the preceding period. Choose the vertical scale so that the relative frequencies are represented. 17) _____

Vehicle	Sales
Economy	34
Sports	8.5
Family	59.5
Luxury	17
Truck	51

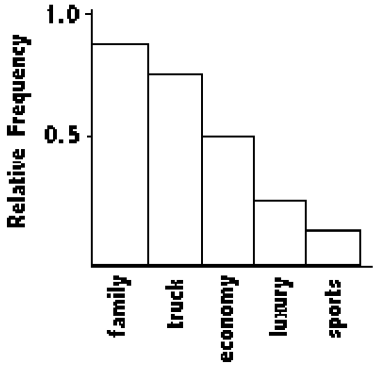


Construct a Pareto chart to help him decide.

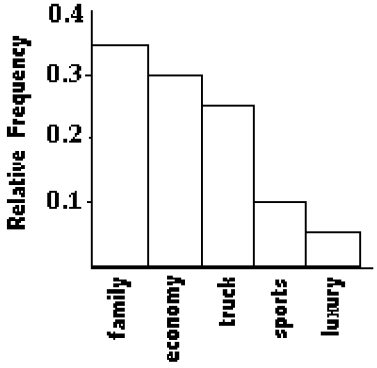
A)



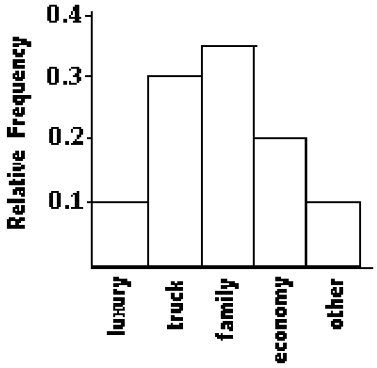
B)



C)



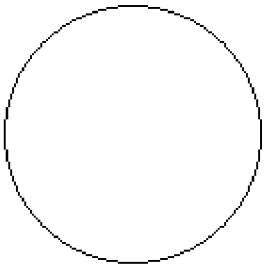
D)



Construct a pie chart representing the given data set.

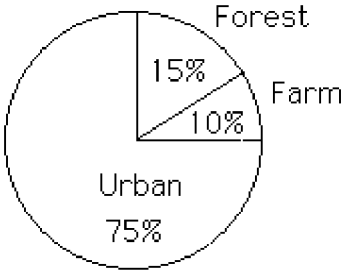
18) The following figures give the distribution of land (in acres) for a county containing 66,000 acres. 18) _____

Forest Farm Urban
9900 6600 49,500



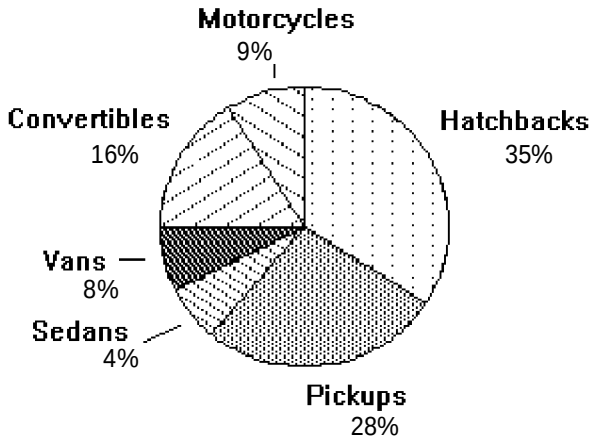
A)

B)



Use the pie chart to solve the problem.

19) A survey of the 4571 vehicles on the campus of State University yielded the following pie chart. 19) _____



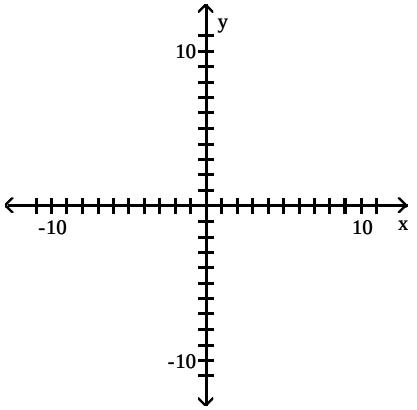
What percent of the vehicles are hatchbacks?

A) 35% B) 28% C) 160% D) 8%

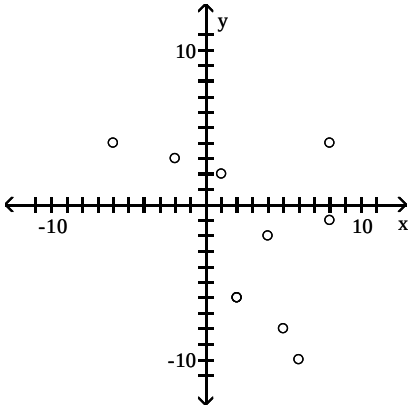
Use the given paired data to construct a scatterplot.

20) x -2 -8 -5 -1 -8 2 -6 6 -4 -2 20) _____

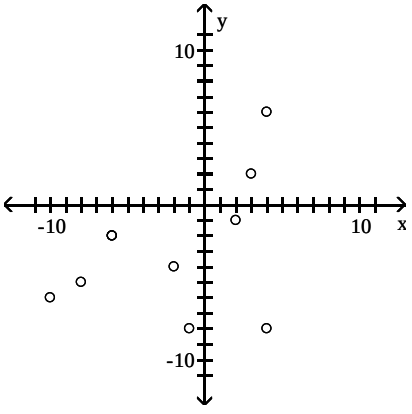
y -6 -1 -8 2 4 3 -10 4 -2 -6



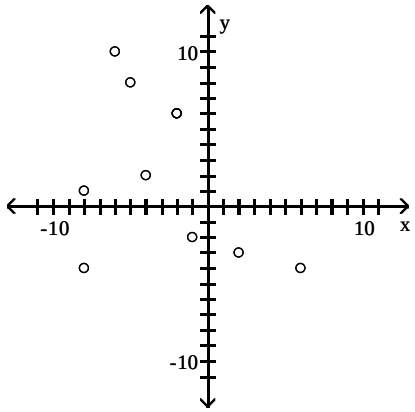
A)



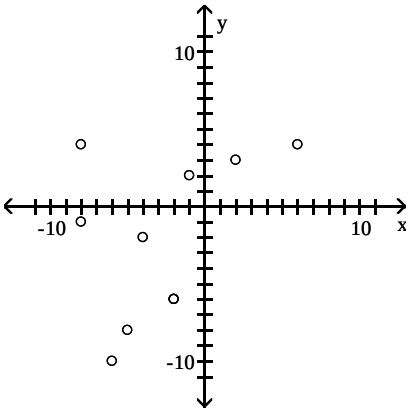
B)



C)



D)

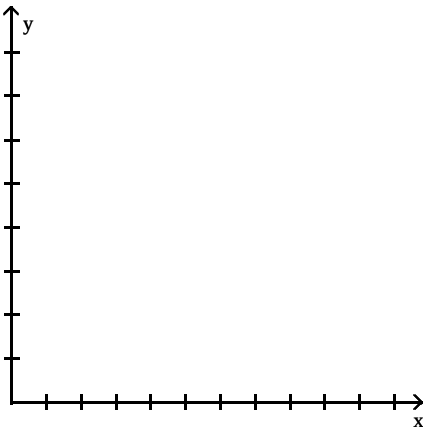


SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

21) Use the high closing values of Naristar Inc. stock from the years 1990 - 2001 to construct a time-series graph. (Let x = 0 represent 1990 and so on.) Identify a trend. 21) _____

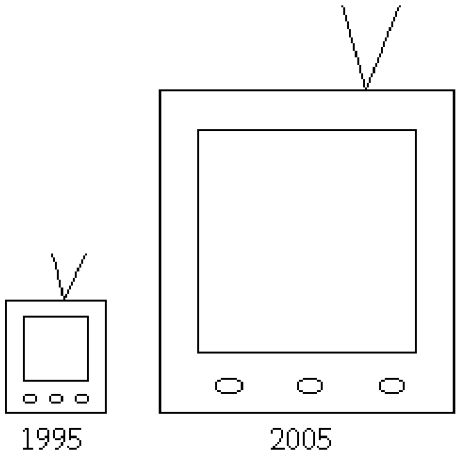
Year	High	Year	High
1990	42	1996	47
1991	40	1997	60
1992	31	1998	61
1993	42	1999	57
1994	44	2000	54
1995	47	2001	30



22) An annual survey sent to retail store managers contained the question "Did your store suffer any losses due to employee theft?" The responses are summarized in the table for two years, 2000 and 2005. Construct a multiple bar graph of the data, then describe any trends. 22) _____

Employee Theft	Percentage in 2000	Percentage in 2005
Yes	49	32
No	51	68
Totals	100	100

23) A television manufacturer sold three times as many televisions in 2005 as it did in 1995. To illustrate this fact, the manufacturer draws a graph as shown below. The television on the right is three times as tall and three times as wide as the television on the left. Why is this graph misleading? What visual impression is created by the graph? 23) _____



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

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.

24) The weights (in pounds) of six dogs are listed below. Find the mean weight. 24) _____

13 21 75 21 134 60

A) 54 lb B) 53.5 lb C) 64.8 lb D) 54.5 lb

Find the median for the given sample data.

25) The ages (in years) of the eight passengers on a bus are listed below. 25) _____

6 4 25 19 26 49 36 33

Find the median age.

A) 25 yr B) 25.5 yr C) 26 yr D) 24.5 yr

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

26) 77 52 32 52 29 77 26) _____

A) 77 B) 53.2 C) 52 D) 77, 52

Find the midrange for the given sample data.

27) A meteorologist records the number of clear days in a given year in each of 21 different U.S. cities. The results are shown below. Find the midrange. 27) _____

72 143 52 84 100 98 101
120 99 121 86 60 59 71
125 130 104 74 83 55 169

A) 112 days B) 110.5 days C) 98 days D) 117 days

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

Find the mean and median for each of the two samples, then compare the two sets of results.

28) A comparison is made between summer electric bills of those who have central air and those who have window units. 28) _____

	May	June	July	Aug	Sept
Central	$32	$64	$80	$90	$65
Window	$15	$84	$99	$120	$40

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

Find the mean of the data summarized in the given frequency distribution.

29) A company had 80 employees whose salaries are summarized in the frequency distribution below. Find the mean salary. 29) _____

Salary ($)	Employees
5,001 - 10,000	16
10,001 - 15,000	14
15,001 - 20,000	15
20,001 - 25,000	17
25,001 - 30,000	18

A) $16,143.75 B) $17,500 C) $17,937.50 D) $19,731.25

Solve the problem.

30) A student earned grades of 91, 76, 92, and 79 on her four regular tests. She earned a grade of 79 on the final exam and 85 on her class projects. Her combined homework grade was 87. The four regular tests count for 40% of the final grade, the final exam counts for 30%, the project counts for 10%, and homework counts for 20%. What is her weighted mean grade? Round to one decimal place. 30) _____

A) 84.2 B) 84.1 C) 82.4 D) 83.4

Find the range for the given sample data.

31) Rich Borne teaches Chemistry 101. Last week he gave his students a quiz. Their scores are listed below. 31) _____

22 31 47 29 31 12 48 41 50 56 37 22

A) 44 B) 9 C) 12 D) 56

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

32) 19 11 12 7 11 32) _____

A) 19.0 B) 15.2 C) 49.0 D) 18.9

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

33) The top nine scores on the organic chemistry midterm are as follows. 33) _____

37, 24, 53, 49, 44, 63, 28, 49, 30

A) 13.9 B) 13.0 C) 5.2 D) 12.3

Find the coefficient of variation for each of the two sets of data, then compare the variation. Round results to one decimal place.

34) Compare the variation in heights to the variation in weights of thirteen-year old girls. The heights (in inches) and weights (in pounds) of nine randomly selected thirteen-year old girls are listed below. 34) _____

Heights (inches): 59.2 61.4 62.4 64.7 60.1 58.3 64.6 63.7 66.1

Weights (pounds): 86 94 92 119 96 90 123 98 139

A) Heights: 4.4%
Weights: 17.6%
There is substantially more variation in the weights than in the heights of the girls.

B) Heights: 4.1%
Weights: 16.7%
There is substantially more variation in the weights than in the heights of the girls.

C) Heights: 11.5%
Weights: 6.6%
There is substantially more variation in the heights than in the weights of the girls.

D) Heights: 4.6%
Weights: 18.4%
There is substantially more variation in the weights than in the heights of the girls.

Find the range, variance, and standard deviation for each of the two samples, then compare the two sets of results.

35) When investigating times required for drive-through service, the following results (in seconds) were obtained. 35) _____

Restaurant A	120	67	89	97	124	68	72	96
Restaurant B	115	126	49	56	98	76	78	95

A) Restaurant A: 57 sec; 493.98 sec^2; 22.23 sec
Restaurant B: 56 sec; 727.98 sec^2; 32.89 sec
There is more variation in the times for restaurant B.

B) Restaurant A: 57 sec; 493.98 sec^2; 22.23 sec
Restaurant B: 77 sec; 727.98 sec^2; 26.98 sec
There is more variation in the times for restaurant B.

C) Restaurant A: 75 sec; 493.98 sec^2; 22.23 sec
Restaurant B: 70 sec; 727.98 sec^2; 26.98 sec
There is more variation in the times for restaurant B.

D) Restaurant A: 57 sec; 793.98 sec^2; 28.18 sec
Restaurant B: 77 sec; 727.98 sec^2; 26.98 sec
There is more variation in the times for restaurant A.

Find the standard deviation of the data summarized in the given frequency distribution.

36) A company had 80 employees whose salaries are summarized in the frequency distribution below. Find the standard deviation. 36) _____

Salary (dollars)	Employees
5,001-10,000	14
10,001-15,000	13
15,001-20,000	18
20,001-25,000	18
25,001-30,000	17

A) $6969.4 B) $7526.9 C) $7317.8 D) $7736.0

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

37) The heights in feet of people who work in an office are as follows. 37) _____

6.0 5.5 5.9 5.4 5.8 5.6 5.7 6.2 5.6 5.6

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

Use the empirical rule to solve the problem.

38) 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? 38) _____

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

Solve the problem.

39) The ages of the members of a gym have a mean of 47 years and a standard deviation of 10 years. What can you conclude from Chebyshev's theorem about the percentage of gym members aged between 32 and 62? 39) _____

A) The percentage is at most 55.6%
B) The percentage is approximately 33.3%
C) The percentage is at least 33.3%
D) The percentage is at least 55.6%

Solve the problem. Round results to the nearest hundredth.

40) Scores on a test have a mean of 75 and a standard deviation of 9. Michelle has a score of 84. Convert Michelle's score to a z-score. 40) _____

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

41) A department store, on average, has daily sales of $28,993.06. The standard deviation of sales is $ 1000. On Tuesday, the store sold $34,199.86 worth of goods. Find Tuesday's z score. Was Tuesday an unusually good day? 41) _____

A) 5.52, yes B) 5.21, yes C) 5.47, no D) 4.17, no

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

42) The test scores on the Chapter 7 mathematics test have a mean of 66 and a standard deviation of 13. Andrea scored 89 on the test. How many standard deviations from the mean is that? 42) _____

A) 1.77 standard deviations above the mean B) 1.77 standard deviations below the mean
C) 0.60 standard deviations below the mean D) 0.60 standard deviations above 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.

43) A body temperature of 96.5° F given that human body temperatures have a mean of 98.20° F and a standard deviation of 0.62°. 43) _____

A) -2.8; unusual B) -1.7; not usual
C) -2.8; not unusual D) 2.8; unusual

Determine which score corresponds to the higher relative position.

44) 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? 44) _____

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

Find the percentile for the data value.

45) Data set: 53 45 39 69 66 72 44; data value: 53 45) _____

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

Find the indicated measure.

46) Use the given sample data to find Q_3. 46) _____

49 52 52 52 74 67 55 55

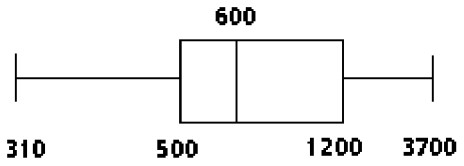
A) 6.0 B) 67.0 C) 61.0 D) 55.0

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

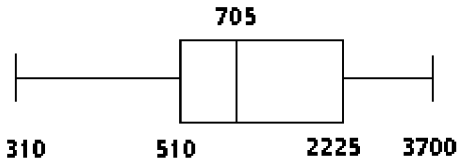
47) The weekly salaries (in dollars) of 24 randomly selected employees of a company are shown below. Construct a boxplot for the data set. 47) _____

310 320 450 460 470 500 520 540
580 600 650 700 710 840 870 900
1000 1200 1250 1300 1400 1720 2500 3700

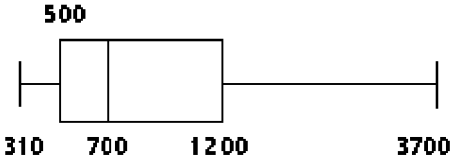
A)



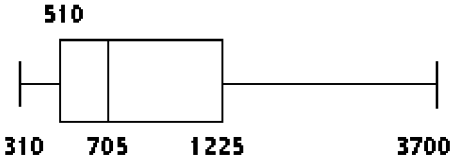
B)



C)



D)

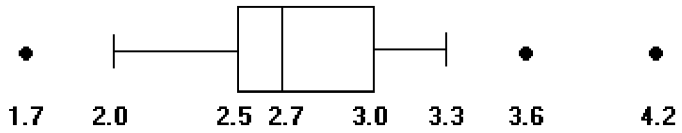


Construct a modified boxplot for the data. Identify any outliers.

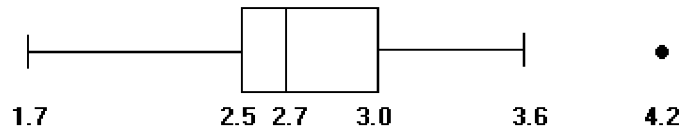
48) The weights (in ounces) of 27 tomatoes are listed below. 48) _____

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

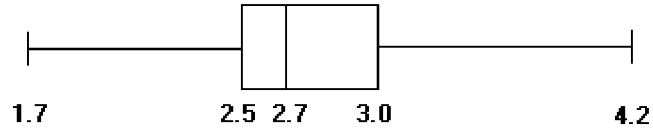
A) Outliers: 1.7 oz, 3.6 oz, 4.2 oz



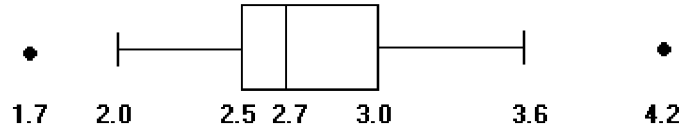
B) Outlier: 4.2 oz



C) No outliers



D) Outliers: 1.7 oz, 4.2 oz



Provide an appropriate response.

49) For data which are heavily skewed to the right, P_{10} is likely to be closer to the median than P_{90}. 49) _____

True or false?

A) True B) False

50) If all the values in a data set are converted to z-scores, the shape of the distribution of the z-scores will be bell-shaped regardless of the distribution of the original data. True or false? 50) _____

A) True B) False

51) In a data set containing n values, the 67th percentile can be found as follows: 51) _____

$$P_{67} = \frac{67}{100} \cdot n.$$

True or false?

A) False B) True

52) Which of the following statements regarding percentiles is true? (More than one statement may be true). 52) _____

A : In any data set, P_{90} is greater than P_{80}

B: In any data set, $\frac{P_{10} + P_{90}}{2}$ is equal to Q_2

C: In a set of 20 test scores, the percentile of the second highest score is 95

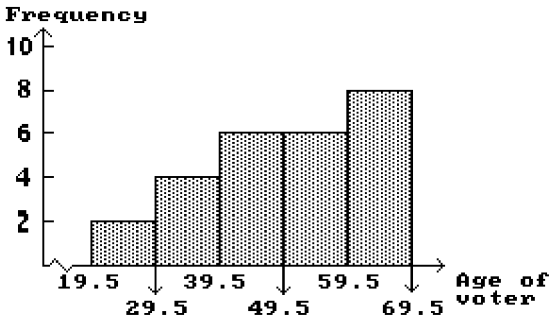
A) B B) A

C) C D) All of the above

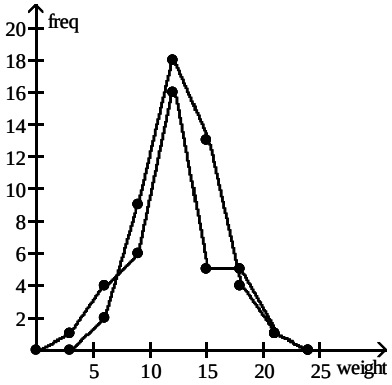
1) C
2) No; no; The frequencies do not increase, reach a maximum, and then decrease.
3) A
4) D
5)

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

6) C
7) D
8) The approximate age at the center is 50.

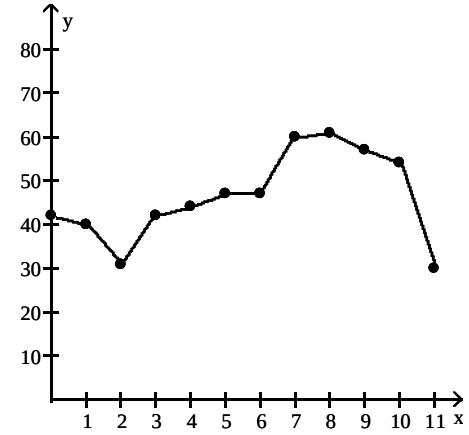


9) The two histograms will have the same shape. They will also have the same scale on the horizontal axis. They will differ only in the scales on the vertical axis: the histogram will show frequencies on the vertical axis while the relative frequency histogram will show relative frequencies.
10) There does not appear to be a significant difference.

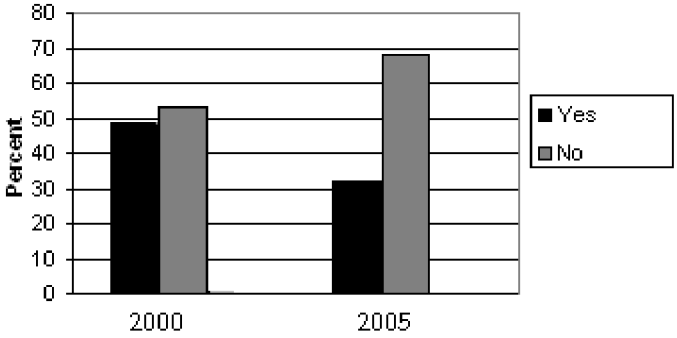


11) B
12) A
13) B
14) D
15) C

16) C
17) A
18) B
19) A
20) D
21) Trend: Answers will vary. Possible answer: High closing stock values show a decrease from 1990 through 1992, after which the value of the stock rose through 1998. Another decrease occurred in 1999 and continued through 2001.



22) Losses due to employee theft have decreased from 2000 to 2005.



23) The area of the television on the right is nine times (not three times) the area of the television on the left. The graph gives the visual impression that sales in 2005 were nine times the sales in 1995.
24) A
25) B
26) D
27) B
28) Central air: mean = $66.20; median = $65
Window unit: mean = $71.60; median = $84
Window units appear to be significantly more expensive.
29) C
30) D
31) A
32) A
33) B
34) A
35) B
36) A
37) B

38) C
39) D
40) D
41) B
42) A
43) A
44) C
45) C
46) C
47) D
48) D
49) A
50) B
51) A
52) B