

Unit 4 Review 1

AP STAT- Ch. 4 and Ch. 5 practice

1) Use the following data: {5, 7, 8, 10, 12, 15, 17, 20, 30, 31, 22, 25, 28, 33, 34, 35, 39, 40} (list Ques1)

a. Find the Mean, Median, Range, IQR, and Standard deviation.

$\bar{x} = 22.8$ Median 23.5
 Range (40-5) = 35
 IQR (33-12) = 21
 $s_x = 11.52$

b. Create a boxplot of the data

c. Suppose we add the data point 62 to this set of data. Indicate how each of the statistics in part (a) would change: increase, decrease, or stay about the same.

Median 25
 Range (62-5) = 57
 IQR (34-12) = 22
 $s_x = 13.97$

Everything would increase $\bar{x} = 24.9$

2) The following are quiz scores from two Algebra 1 Classes.

Class 1: {68, 93, 53, 100, 77, 86, 91, 88, 72, 74, 66, 82} and Class 2: {77, 91, 82, 68, 75, 72, 85, 65, 70, 79, 94, 86}

a. Compare the means of the class scores. Which would you rather be in?

$\bar{x} = 79.1$ Based solely on the mean there is very little difference $\bar{x} = 78.67$

b. Compare the standard deviations. Which class was more consistent in their scores?

$s_x = 13.36$ Class 2 is more consistent in their scores $s_x = 9.19$

3) Based solely on the mean and median given, decide on the shape of the distribution, and what measure of center and spread you would report.

(a) Mean = 100
Median = 98

(b) Mean = 20
Median = 41

(c) Mean = 934
Median = 850

Normal Distribution
Symmetrical

Skewed left
Outliers are pulling the mean way down below the median

Skewed right
Mean is higher than the median so there are probably outliers to the right.

4) Use the following set of data:

{3, 4, 4, 4, 5, 6, 6, 7, 8, 10, 11, 11, 16, 17, 20, 25, 28, 30, 31, 39, 45, 59, 68, 73} (list Ques4)

a. Look at (not draw) a histogram of the data (just use Zoom 9, no need to adjust the window).

b. Describe the distribution (be sure to use the correct measure of center and spread)

The distribution is unimodal and skewed right.

c. Are there any outliers present? Justify your answer.

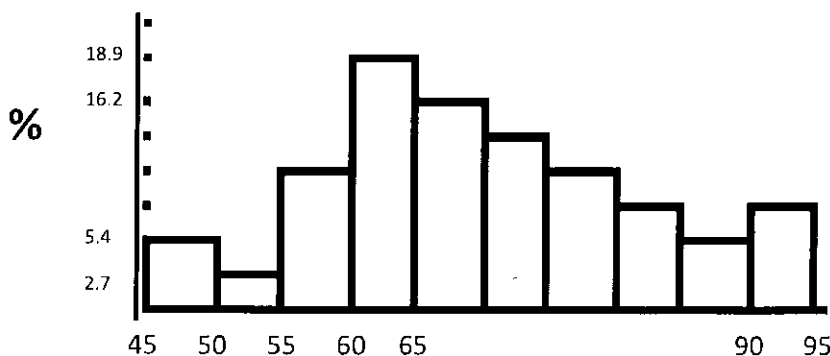
$IQR = 30.5 - 6 = 24.5$ $30.5 + 24.5 = 55$

59, 68, 73 are outliers

5) Give a set of numbers that would have a standard deviation of 0

4, 4, 4, 4, 4, 4, 4

6) The Presidents of the USA and their Age of Death (list PRES). Look at the Relative Frequency Histogram and describe the distribution.



Presidents Ages of Death

Description:

Unimodal

Skewed right

Spread = 50

Mode = 60-65

Median is 65-70

Unit 4 Review 2

Name: _____

Chapter 16 Worksheet #2 and Notes on Histograms and Box and Whisker Plots Algebra, Mrs. Slack-Joles

1) Using the data below, complete the frequency table.

DATA: ~~30, 32, 11, 14, 40, 37, 16, 26, 12, 33, 13, 19, 38, 12, 28, 15, 39, 11, 37, 17, 27, 14, 36~~

Number	Tally	Frequency
11-15	 	8
16-20		3
21-25		0
26-30		4
31-35		2
36-40	 	6

23

2) The test scores for 10 students in Ms. Sampson's homeroom were 61, 67, 81, 83, 87, 88, 89, 90, 98, and 100. Which frequency table is accurate for this set of data?

A)

Interval	Frequency
61-70	2
71-80	2
81-90	8
91-100	10

C)

Interval	Frequency
61-70	2
71-80	2
81-90	7
91-100	10

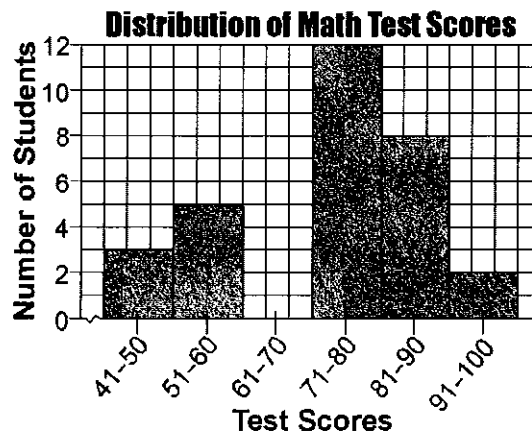
B)

Interval	Frequency
61-70	2
71-80	0
81-90	6
91-100	2

D)

Interval	Frequency
61-70	2
71-80	0
81-90	8
91-100	10

- 3) The graph below shows the distribution of scores of 30 students on a mathematics test.

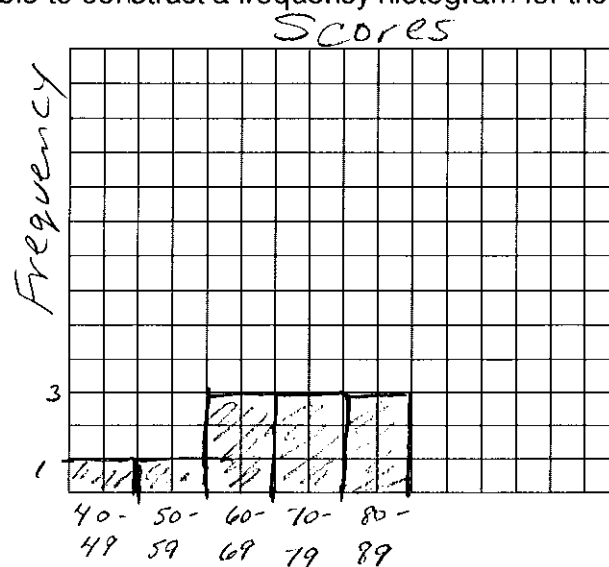


Complete the frequency table below using the data in the frequency histogram shown.

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

- 4) The scores on a mathematics test were ~~70~~, ~~55~~, ~~61~~, ~~80~~, ~~85~~, ~~72~~, ~~65~~, ~~40~~, ~~74~~, ~~68~~, and ~~84~~. Complete the accompanying table, and use the table to construct a frequency histogram for these scores.

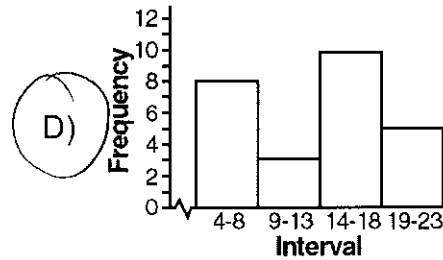
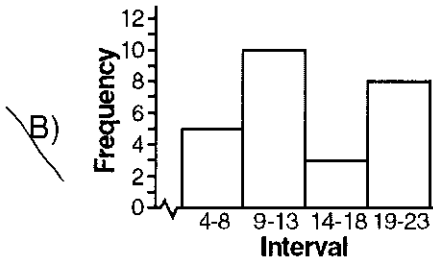
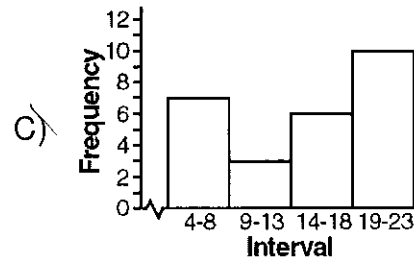
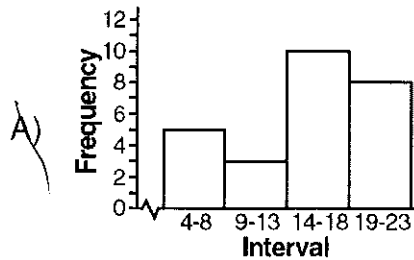
Score	Tally	Frequency
40-49	/	1
50-59	/	1
60-69	///	3
70-79	///	3
80-89	///	3



Interval

5) Which one of the following histograms represents the data in the table below?

Interval	Frequency
4-8	8
9-13	3
14-18	10
19-23	5

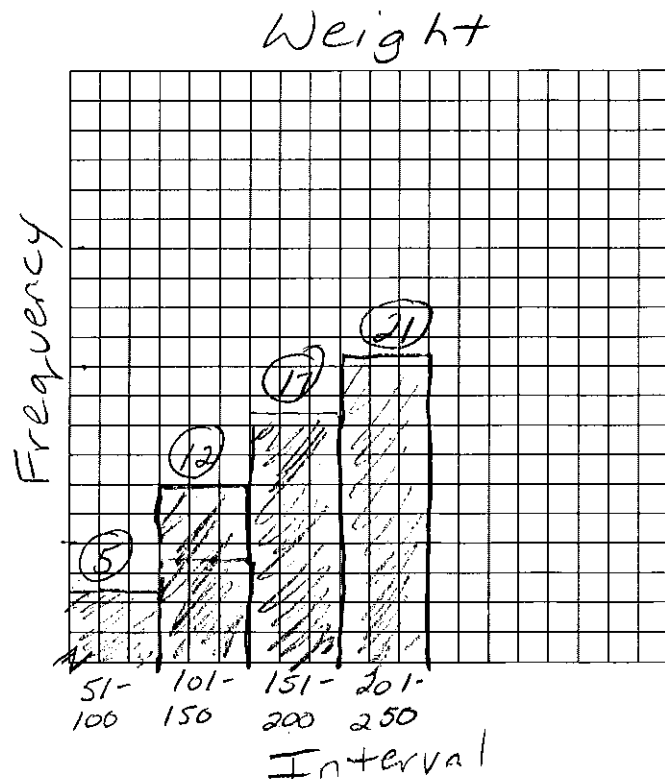


6) The following data consists of the weights, in pounds, of 24 high school students: 195, 206, 100, 98, 150, 210, 195, 106, 195, 108, 180, 212, 104, 195, 100, 216, 99, 206, 116, 142, 100, 135, 98, 160.

Using this data, complete the accompanying cumulative frequency table and construct a cumulative frequency histogram on the grid below.

Interval	Frequency	Cumulative Frequency
51-100	////	5 5
101-150	//// //	7 12
151-200	////	5 17
201-250	////	4 21

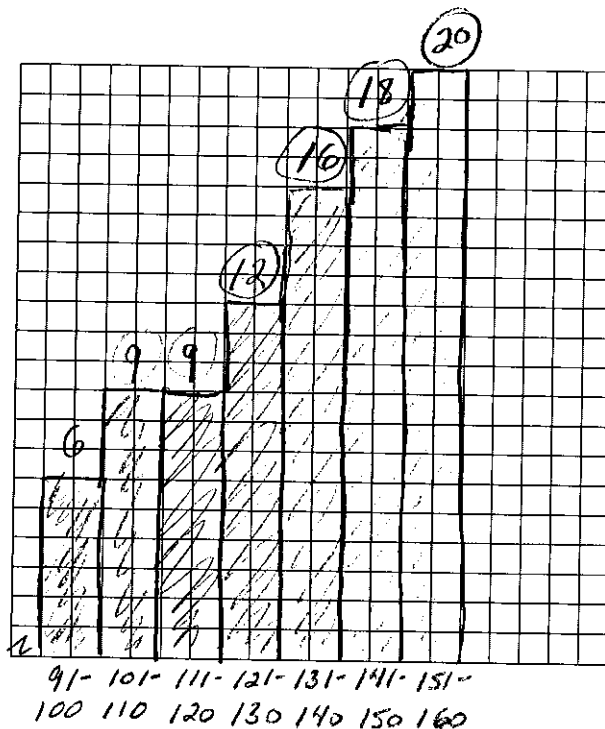
21



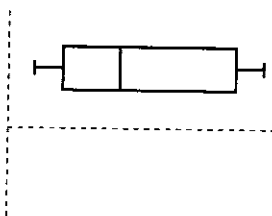
- 7) The accompanying table shows the weights, in pounds, for the students in an algebra class. Using the data, complete the cumulative frequency table and construct a cumulative frequency histogram on the grid below.

Interval	Frequency	Cumulative Frequency
91-100	6	6
101-110	3	9
111-120	0	9
121-130	3	12
131-140	4	16
141-150	2	18
151-160	2	20

20



- 8) The accompanying diagram is an example of which type of graph?



- A) bar graph
- B) histogram

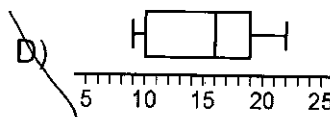
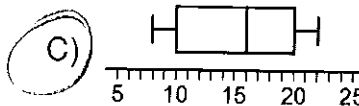
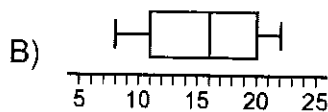
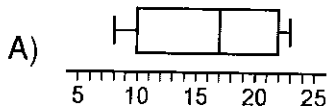
- C) box-and-whisker plot
- D) stem-and-leaf plot

- 9) Given the following data:

10, 8, 9, 16, 19, 15, 20, 16, 21, 22, 10

8 9 10 15 16 16 19 19 20 21 22

Which of the following is the box-and-whisker graph for this data?



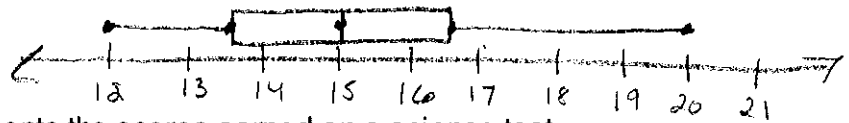
12
13.5
15
16.5
20

10) Construct a box-and-whisker graph using the following data:

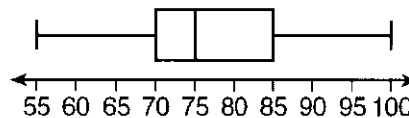
~~16, 12, 13, 14, 16, 18, 15, 17, 20, 12, 14, 15, 18~~

12 12 13 | 14 14 15 15 15 16 16 | 17 18 20

Questions 11 through 14 refer to the following:



The accompanying box-and-whisker plot represents the scores earned on a science test.



11) According to the diagram shown, what is the median score?

- A) 75
- B) 70
- C) 85
- D) 77

12) According to the diagram shown, what score represents the first quartile?

- A) 55
- B) 70
- C) 100
- D) 75

13) What statement is *not* true about the box and whisker plot shown?

- A) 75 represents the mean score
- B) 100 represents the maximum score
- C) 85 represents the 3rd quartile
- D) 55 represents the minimum score

14) A score of an 85 on the box-and-whisker plot shown refers to

- A) the third quartile
- B) the maximum score
- C) the median
- D) the mean

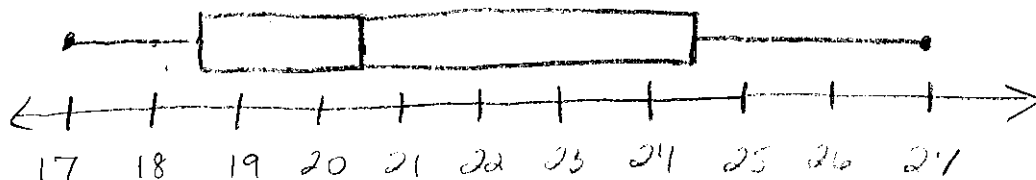
15) (a) Arrange the following data from *least* to *greatest* and find the median. 20.5

~~20, 25, 24, 17, 18, 19, 21, 27~~ 17 18/19 20/21 24/25 27

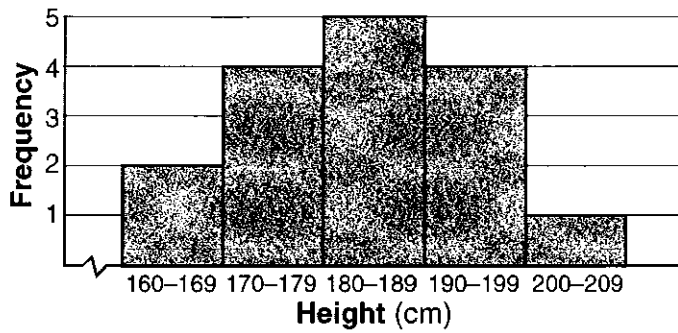
(b) Find the median of the upper half of the data. What is this called? 24.5 Q3

(c) Find the median of the lower half of the data. What is this called? 18.5 Q1

(d) Draw a box-and-whisker graph using the above information.



- 16) The accompanying histogram shows the heights of the students in Kyra's health class.

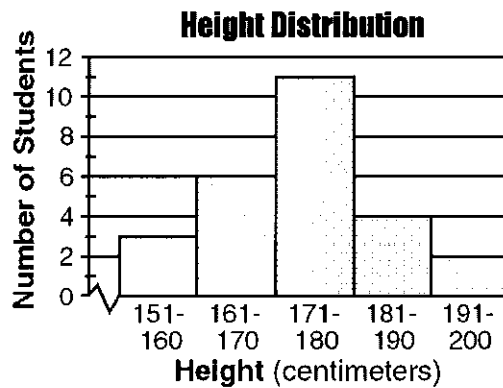


24
5
4
1

What is the total number of students in the class?

- A) 15 B) 209 C) 16 D) 5

- 17) The accompanying histogram shows the height distribution for students in a high school mathematics class.



36
11
4
2

26

What is the total number of students in the class?

- A) 28 B) 26 C) 49 D) 11

- 18) Using the cumulative frequency table below, how many students received a test score between a 70-79?

Scores on a French Test

Interval	Cumulative Frequency
50-99	30
50-89	24
50-79	12
50-69	12
50-59	2

A) 0

- B) 80 C) 12 D) 26

Questions 19 through 21 refer to the following:

The test scores for 20 students in a Spanish class are shown in the frequency table below.

Interval	Frequency
90-99	4
80-89	3
70-79	8
60-69	4
50-59	1

20

19) According to the information shown, how many students received a score greater than a 69?

19

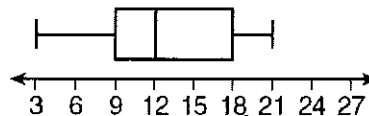
20) The median lies in which interval of the frequency table shown?

70 - 79

21) The upper quartile lies in which interval of the frequency table shown?

80 - 89

22) Which of the following sets of data values could represent the box-and-whisker plot below?



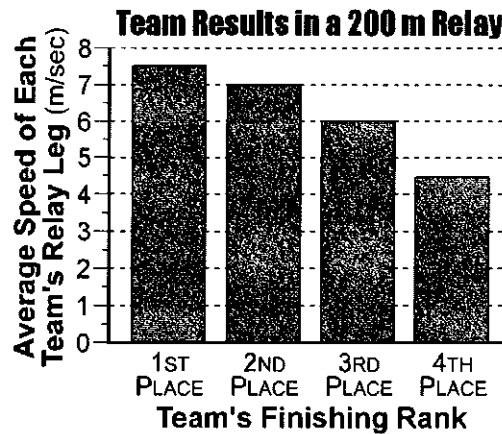
~~A) 3, 10, 11, 13, 21~~

~~B) 3, 6, 9, 12, 15, 18, 21~~

C) 3, 9, 10, 12, 16, 18, 21

D) 3, 9, 10, 11, 13, 15, 18, 21

- 23) The USA Track and Field Committee published the following report illustrating the comparison of lap speed and finishing placement of several top relay teams.



Based on the bar graph above, which of the following conclusions is *most* accurate?

- A) The first-place team was twice as fast as the fourth-place team.
 - B) The fastest time for the 200-meter relay is 7 meters per second.
 - C) The first-place and second-place teams were closest in time to one another.
 - D) Every runner on the first-place team ran faster than the runners on the second-place team.
- 24) A television network wants to pilot a new series in a city with 25,000 residents. They decided to choose a random sample of 1,000 people to determine the best time to run the series. The survey asked participants to state what time of day they watched the most television. The table below shows the results.

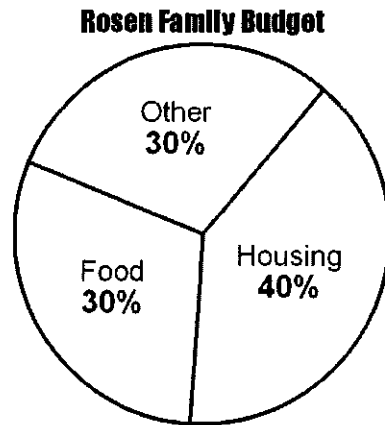
Time of Day	Number of People
8 am–noon	162
noon–4 pm	187
4 pm–7 pm	322
7 pm–11 pm	258
11 pm–8 am	71

Based on these results, approximately how many people in the city watch television between 4 pm and 7 pm?

- A) 8,050 people
- B) 1,450 people
- C) 14,500 people
- D) 580 people

$(.322)(25,000)$

- 25) The Statistical Data Bureau published an analysis of incomes and expenditures of 100 average families throughout the United States. The circle graph below represents the Rosen family's monthly budget.

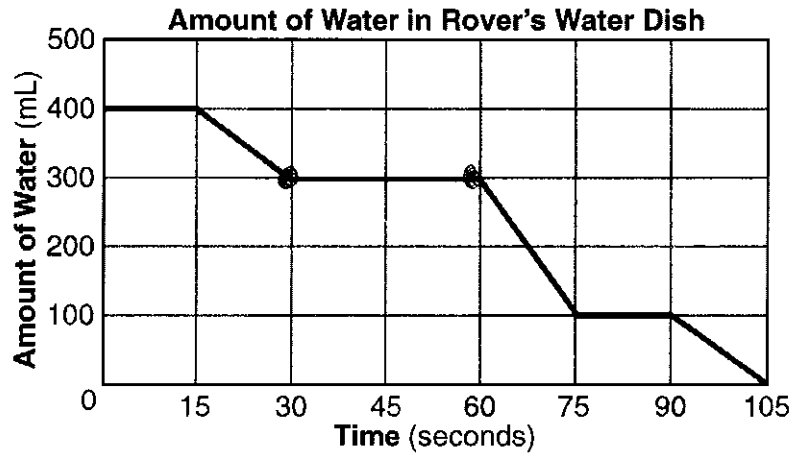


1820 (.30)

If their total monthly income is \$1,820, how much money do they spend each month on food?

- A) \$546 B) \$728 C) \$606 D) \$182

- 26) The accompanying graph shows the amount of water left in Rover's water dish over a period of time.



How long did Rover wait from the end of his first drink to the start of his second drink of water?

- A) 60 sec B) 30 sec C) 10 sec D) 75 sec

- 27) Janae's first seven French grades for the year are ~~91~~, ~~87~~, ~~80~~, ~~99~~, ~~85~~, ~~78~~, and ~~90~~. What grade is at the 75th percentile?

- A) 90 B) 78 C) 90.5 D) 91

78 80 85 87 90 91 99

17 24 27 32 38/42 52 58 69 73

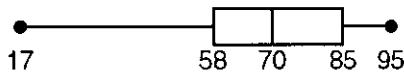
28) Terri waitressed 10 days out of the last two weeks. The amount of money she earned each day in tips are \$32, \$58, \$17, \$27, \$69, \$73, \$42, \$38, \$24, and \$52. How much money is at the 50th percentile?

- A) 42 B) 69 C) 38 D) 40

29) The median of any set of data always represents the

- A) upper quartile C) mean of the data
B) 50th percentile D) 1st quartile

30) Ms. Michalson drew a box-and-whisker plot to represent her students' scores on a recent math test.

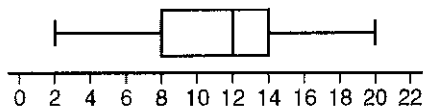


If Jennifer scored a 85 on the test, explain how her grade compares with the rest of her class.

She scored at the 75th percentile.

Questions 31 through 34 refer to the following:

The number of text messages 10 different students sent in 1 day is shown in the box-and-whisker plot below.



31) What is the minimum number of text messages sent according to the plot shown?

- A) 0 B) 2 C) 20 D) 8

32) What number is at the 50th percentile according to the plot shown?

- A) 12 B) 8 C) 14 D) 10

33) According to the plot shown, between what two numbers does half of the data lie?

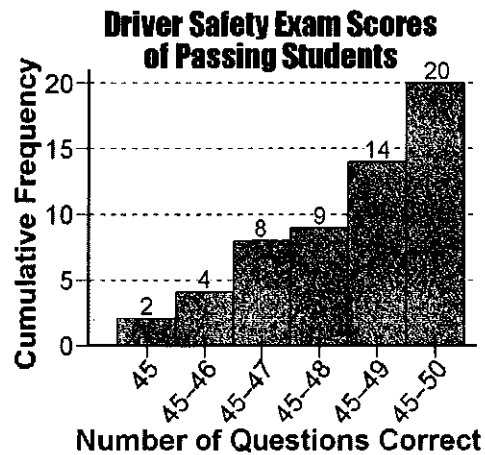
- A) 10 and 12 B) 8 and 12 C) 8 and 14 D) 2 and 20

34) According to the plot shown, how many text messages are at the 75th percentile (upper quartile)?

- A) 15 B) 12 C) 13.5 D) 14

Questions 35 through 37 refer to the following:

In order to pass a driver's safety course, a person must answer at least 45 out of 50 questions correctly. The cumulative histogram below gives the scores of a group of people who passed the exam.



- 35) According to the table shown, how many total people passed the driver's safety exam?
 A) 25 B) 57 C) 50 **D) 20**
- 36) According to the table shown, how many people answered 49 questions correctly?
A) 5 B) 9 C) 14 D) 41
- 37) According to the table shown, how many people received a score of 48 or less?
 A) 23 **B) 9** C) 11 D) 25

Box-and-Whisker Plots

Name _____

FIVE-NUMBER SUMMARIES

In "Counting on Lemurs" on page 8, you analyzed box-and-whisker plots to draw conclusions about different lemur species. Box-and-whisker plots use the five-number summary of a data set. The five-number summary includes the *lower extreme*, *upper extreme*, *lower quartile*, *upper quartile*, and *median*. These values help you draw conclusions about the spread and variability of a data set.

EXAMPLE: Find the five-number summary of the following data set: **23, 14, 37, 9, 4, 32, 29**

Step 1: Order the values from least to greatest:

4, 9, 14, 23, 29, 32, 37

Step 2: Identify the lower extreme (the least value) and upper extreme (the greatest value):

Lower extreme: 4

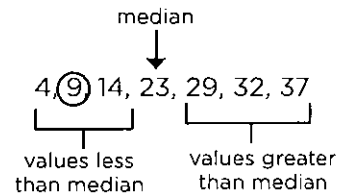
Upper extreme: 37

Step 3: Find the median, or middle value:

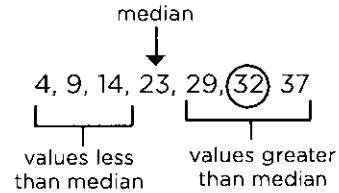
4, 9, 14, **23**, 29, 32, 37

Note: In a data set with an even number of values, the median will be the average of the two middle values.

Step 4: Find the lower quartile—the median of the values less than the middle value:



Step 5: Find the upper quartile—the median of the values greater than the middle value:



Find the five-number summaries of the following data sets.

1 Calvin received the following math exam grades this term: 94, 88, 57, 78, 94, 78, 86, 90, 92.

- A. What is the lower extreme of the data set? 57
- B. What is the upper extreme? 94
- C. What is the median? 88
- D. What is the lower quartile? 78
- E. What is the upper quartile? 93

2 On a recent trip to the beach, Jaya collected seashells. The lengths of the seashells, in inches, were 2, 4, 2, 3, 2, 4, 1, and 3.

- A. What is the lower extreme of the data set? 1
- B. What is the upper extreme? 4
- C. What is the median? 2.5
- D. What is the lower quartile? 2
- E. What is the upper quartile? 3.5

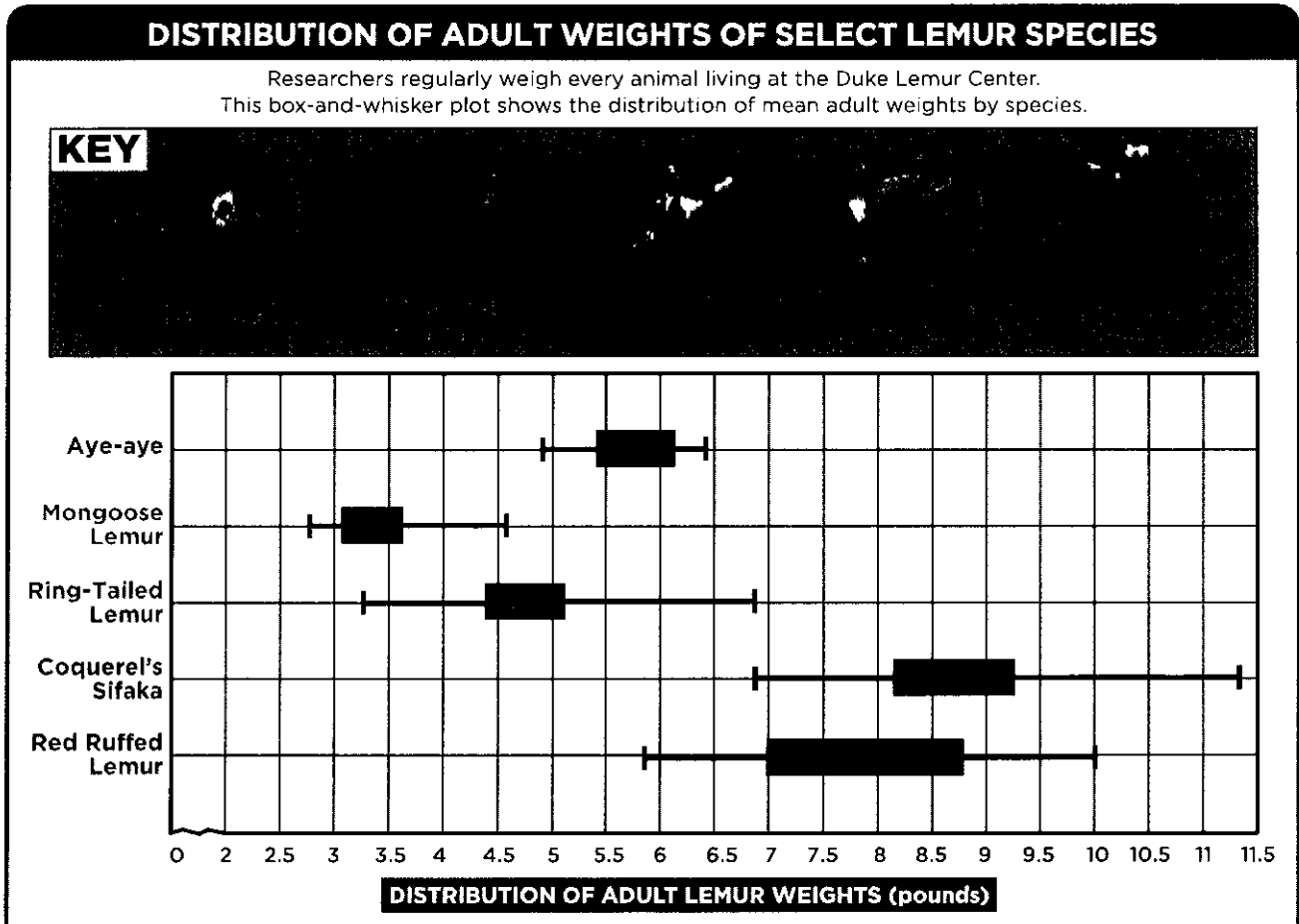
57 78 78 86 88 90 92 94 94

1 2 2 2 3 3 4 4

Name _____

LEMURS WEIGH IN

In "Counting on Lemurs" on page 8, you practiced reading box-and-whisker plots. This type of graph displays the spread of a data set so that you can easily spot the high, low, and median values. Use what you learned to answer five more questions about the weights of different lemur species shown in the box-and-whisker plots below.



1 Which lemur species has the highest median weight?

Coquerel's Sifaka

2 Which species has the smallest difference between its median weight and its lower extreme weight?

Mongoose Lemur

3 Which species has the largest difference between its median weight and its upper extreme weight?

Coquerel's Sifaka

4 Which species has a larger overall weight range: the ring-tailed lemur or the red ruffed lemur?

Red Ruffed Lemur

5 How would you describe the weight distribution of the mongoose lemur?

Upper half has a much wider distribution than the lower half (about double)

Unit 4 Review 4

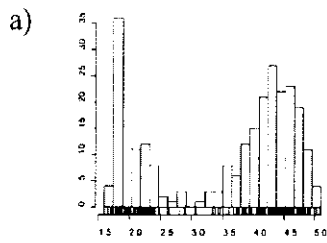
Name: _____

Period: _____

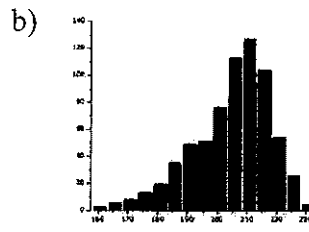
Date: _____

Probability & Statistics – Describing Quantitative Data – Worksheet 1

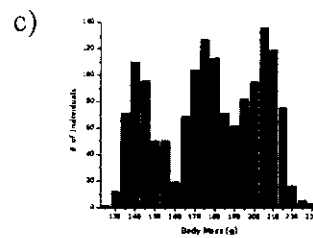
1. Describe the shape of each graph as Unimodal, Bimodal, or Multimodal.



Bimodal

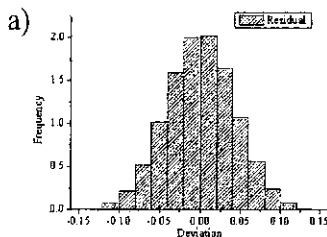


Unimodal

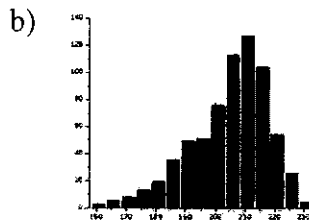


Multimodal

2. Describe the shape of each graph as Uniform, Symmetric, or Skewed.



Symmetric



Skewed Left



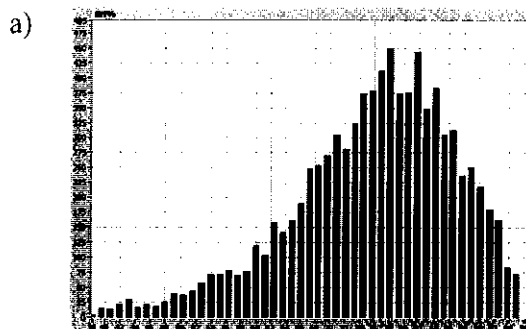
Uniform

3. The measure of the center of a histogram can sometimes be misleading. In a couple of sentences, identify the shape of histograms where the measure of center can be useful and identify the shape of histograms where the measure of center can be misleading.

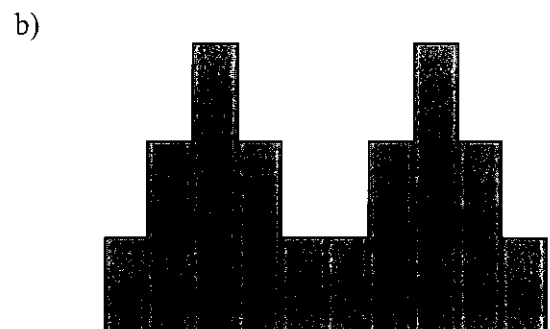
Useful - symmetric, no outliers, bell curve

Misleading - skewed, outliers, gaps

4. In a couple of sentences, describe the shape of the following histograms. (Use words like unimodal, bimodal, multimodal, uniform, symmetric, skewed left, or skewed right in your description.)

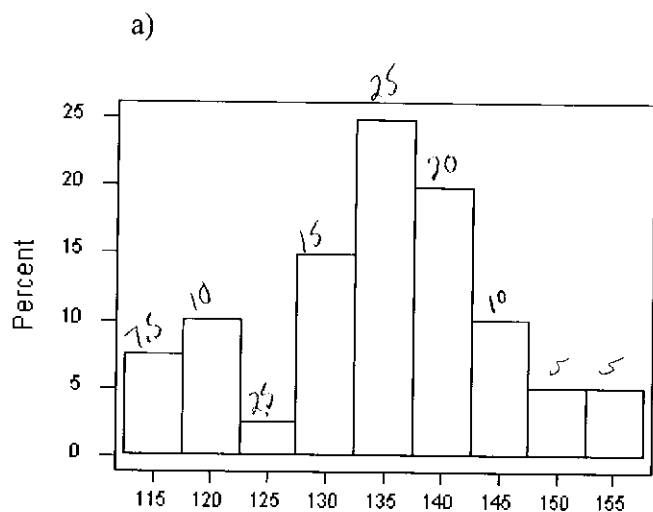


Skewed left
bimodal
No gaps

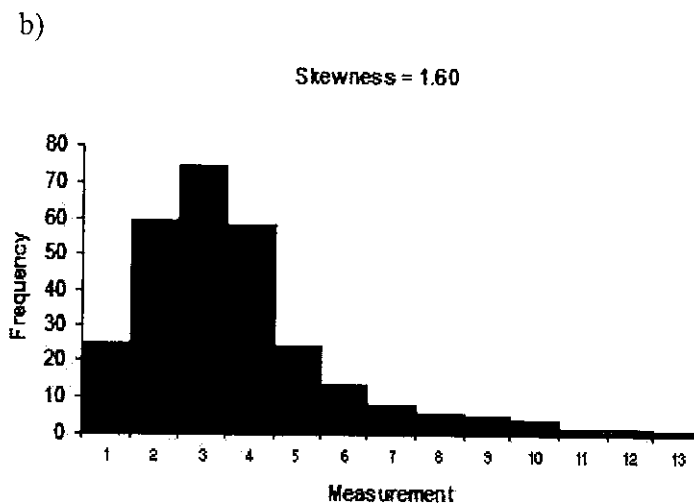


Symmetric
bimodal
No gaps

5. Identify the center of the following graphs.
(Use the number or range of numbers in the center)

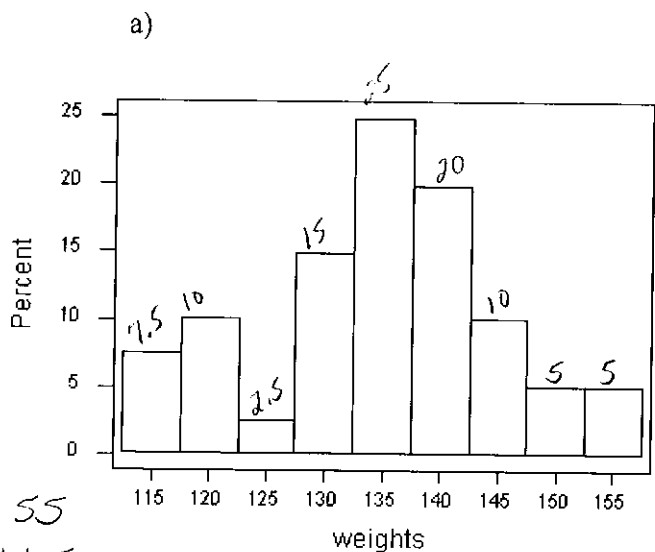


weights
135

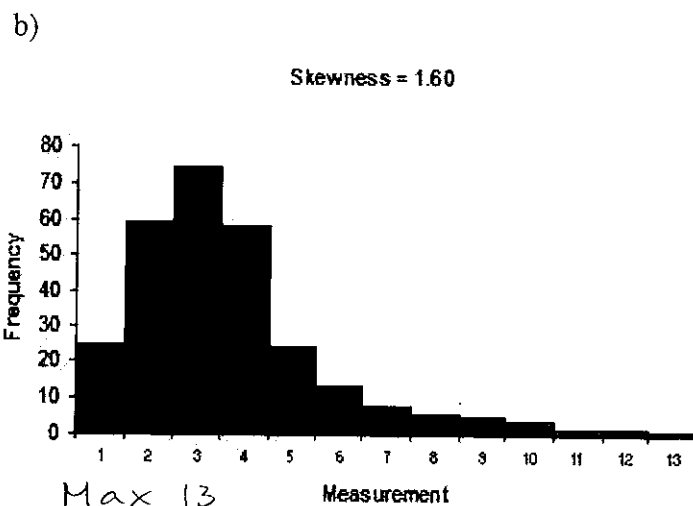


3

6. Identify the approximate maximum and minimum values of each graph, then calculate the range for each set of data.



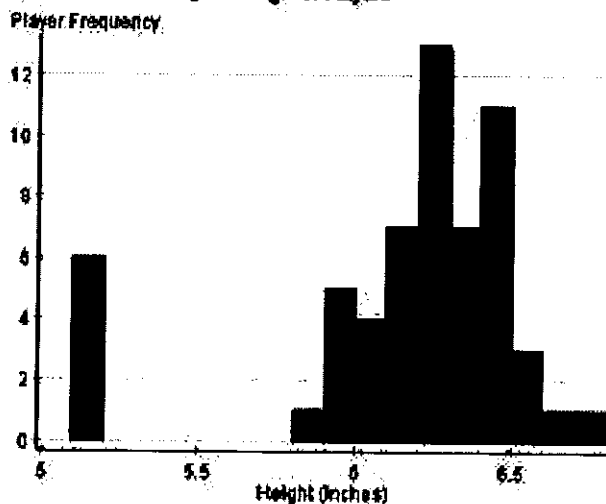
Max 155
Min 115
Range 40 (155 - 115)



Max 13
Min 1
Range 12

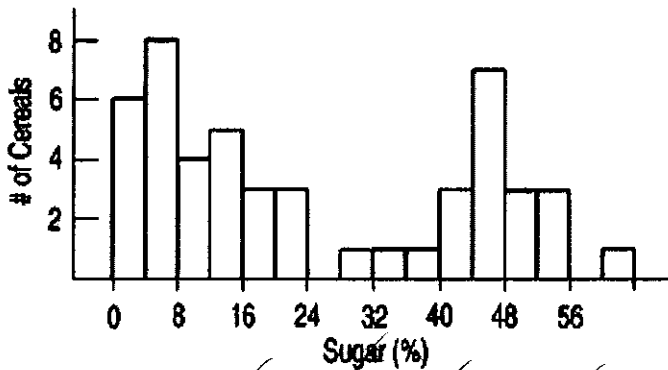
7. Describe any unusual (or special) features of the graph to the right.

Large
Gap



When describing distributions below include shape, center, spread, and special features; be very specific. Include what is happening as well as where it is happening. Remember, a picture is worth a thousand words.

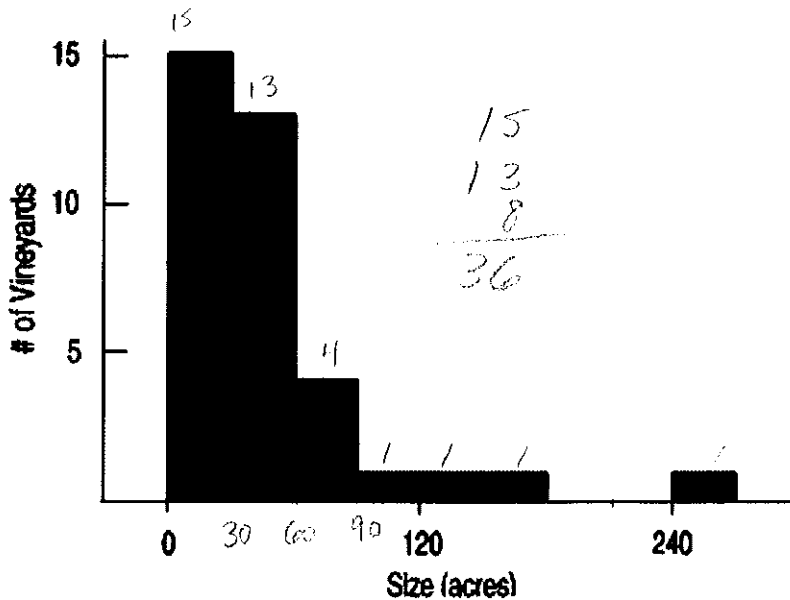
8. **Sugar in cereals.** The histogram displays the sugar content (as a percent of weight) of 49 brands of breakfast cereals.



- a) Describe the distribution. (shape, center, spread, unusual features)
 b) What (in real life) do you think might account for this shape?

Bimodal
 2 Gaps - 1st gap at 24-28 seems to separate the data into 2 separate groups.

9. **Vineyards.** The histogram shows the sizes (in acres) of 36 vineyards in the Finger Lakes region of New York.



- a) Describe the distribution. (shape, center, spread, unusual features)
 b) Approximately what percentage of these vineyards are under 60 acres?

Spread (Range) is approx 604.
 1st group Skewed right.
 2nd group Symmetrical

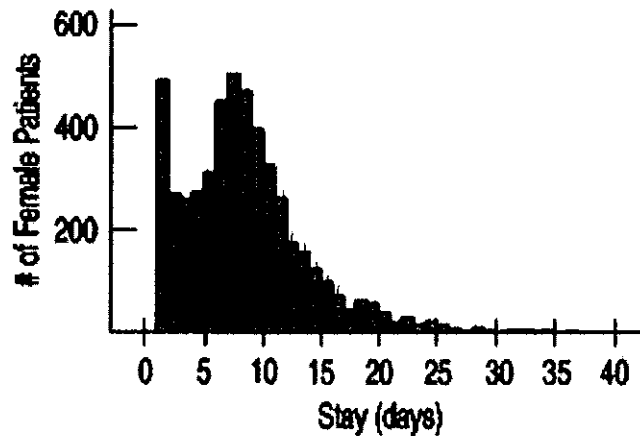
Skewed right
 outliers
 Unimodal
 Gap

$$\frac{28}{36}$$

78%

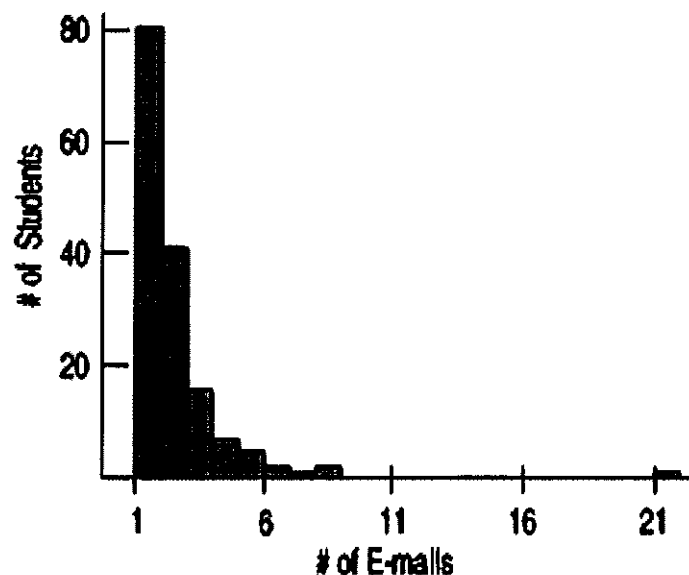
Center is in the 30-60 interval
 Range is approx 270

10. **Heart attack stays.** The histogram shows the lengths of hospital stays (in days) for all the female patients admitted to hospitals in New York during one year with a primary diagnosis of acute myocardial infarction (heart attack).



- a) Describe the distribution. (shape, center, spread, unusual features) *Skewed right, bimodal. Spread approx. 36 days.*
- b) From the histogram, would you expect the mean or median to be larger? Explain. *Mean b/c there are outliers to the right, pulling it higher.*
- c) Why do you think there are so many people who stay for only one day? *They were misdiagnosed or died.*

11. **E-mails.** A university teacher saved every e-mail received from students in a large Introductory Statistics class during an entire term. He then counted, for each student who had sent him at least one e-mail, how many e-mails each student had sent.



- a) Describe the distribution. (shape, center, spread, unusual features) *Skewed right, unimodal. Center 1.*
- b) From the histogram, would you expect the mean or median to be larger? Explain. *Spread 8 (9-1)*