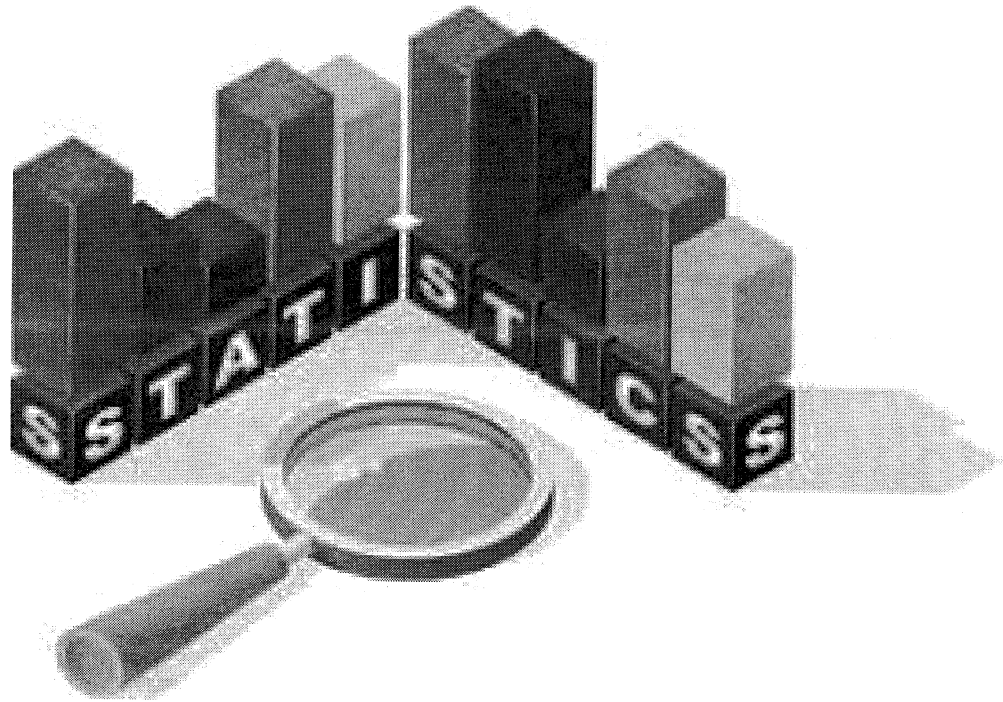


# Unit 7a

# Statistics



Name: \_\_\_\_\_

Period: \_\_\_\_\_

## Notes Section:

## Notes Section:

# Lesson 5 Reteach

## Using Sampling to Predict

A **sample** is a randomly selected smaller group chosen from the larger group, or **population**. An **unbiased sample** is representative of the larger population, selected without preference, and large enough to provide accurate data. A **biased sample** is not representative of the larger population. You can usually make predictions about the characteristics of larger populations based on a smaller sample of the population, depending on the method used to collect the sample.

Types of Unbiased Samples	
Type of Sample	Definition
Simple Random Sample	a sample where each item or person in a population is as likely to be chosen as any other
Stratified Random Sample	a sample in which the population is divided into similar, nonoverlapping groups, and a simple random sample is then chosen from each group
Systematic Random Sample	a sample in which the items or people are selected according to a specific time or item interval
Types of Biased Samples	
Type	Definition
Convenience Sample	a sample that includes members of the population that are easily accessed
Voluntary Response Sample	a sample which involves only those who want to or can participate in the sampling

**Example** A magazine publisher mailed a survey to its subscribers to find out how many plan on renewing their subscriptions this year. Two hundred people responded that they would renew their subscriptions. Is this sampling method valid? If so, about how many of the 8000 subscribers will renew their subscriptions this year?

This is a biased and voluntary response sample since it involves only those who want to participate in the survey. Therefore, this sampling method will not produce an accurate or valid prediction of the total number of subscribers who will renew their subscriptions.

### Exercises

- To determine the consistency of a printer, 100 printed sheets are randomly checked and 4 sheets are defective. What type of sampling method is this? About how many defective sheets would be expected if 2400 sheets were printed?
- A movie theater manager hands out surveys to 100 customers before the movie begins. At the end of the movie, 40 customers return their survey. Of the 40 surveys, 32 said they had a bad experience. What type of sampling method is this? Is this an accurate sampling method? If so, how many of the customers had a bad experience?
- A TV manufacturing company wants to test the quality of their TVs. They randomly pick 50 TVs to test and determine that 4 are defective. What type of sampling method is this? About how many defective TVs would you expect if 1000 TVs are made?

**LESSON**  
**9-1**

**Practice A**  
**Samples and Surveys**

Circle the type of sample that is used in each situation.

- An employee at a DVD store makes survey cards available for customers who want to fill them out.  
 Systematic sample                      Convenience sample                      Self-selected sample
- Jonathan wants to know how often the average American exercises. He surveys 65 people in a park near his home.  
 Systematic sample                      Convenience sample                      Self-selected sample
- Determine which sampling method will better represent the entire population. Justify your answer.

**Sports Survey**

Sampling Method	Results Survey
Franco surveys 20 of his friends during their lunch period.	65% say baseball is their favorite sport.
Monica chooses every 40th name on a list of all students.	30% say baseball is their favorite sport.

- According to the U.S. Census Bureau, about 12% of all workers use a carpool to get to work. Melinda surveys a random sample of workers in two towns. Her data is shown in the table. Compare the samples with the national percent.

**Carpool Data**

Sample	Workers Who Carpool	Workers Who Do Not Carpool
Town A	9	11
Town B	6	44

**LESSON**  
**9-1**

**Practice B**  
**Samples and Surveys**

Identify each type of sampling method.

1. Ronny wants to know how often the average resident of his town eats out. He surveys 45 people as they leave a restaurant. \_\_\_\_\_
2. A worker in a factory checks every 100th car part as it moves past her on an assembly line. \_\_\_\_\_
3. Determine which sampling method will better represent the entire population. Justify your answer.

**Car-Wash Survey**

Sampling Method	Results Survey
Manuel calls every 25th name on a list of customers.	70% say they are satisfied.
Carolyn makes survey cards available to customers who wish to fill them out.	40% say they are satisfied.

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4. According to the U.S. Census Bureau, about 55% of all U.S. households have Internet access. Daljit surveys a random sample of households in two cities. His data is shown in the table. Compare the samples with the national percent.

**Internet Access**

Sample	Households with Access	Households Without Access
City A	22	18
City B	14	36

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**LESSON**  
**9-2**

**Practice A**  
**Identifying Sampling Errors and Bias**

**Determine whether each sample may be biased. Explain.**

1. A group of 30 people at a vegetarian restaurant are surveyed to find out about the eating habits of people in a town.

\_\_\_\_\_

\_\_\_\_\_

2. A dentist chooses 100 names at random from her database of patients and asks these patients how many times per day they brush their teeth.

\_\_\_\_\_

**Determine whether each survey question may be biased. Explain.**

3. What is your opinion of the parking nightmare near the ballpark?

\_\_\_\_\_

4. Do you prefer apple juice, orange juice, or grape juice?

\_\_\_\_\_

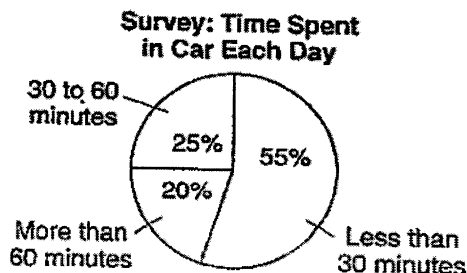
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**Sara wants to know how many minutes residents of her town spend in their cars each day. Use the information below and the graph to answer each question.**

**Sample:** 60 residents of the town who are waiting for a bus

**Question:** How many minutes per day do you spend in your car?

**Claim:** Most residents of the town spend less than 30 minutes per day in their car.



5. Is the sample or question biased? Why?

\_\_\_\_\_

\_\_\_\_\_

6. Is Sara's claim valid? Why or why not?

\_\_\_\_\_

**LESSON**  
**9-2**

**Practice B**  
**Identifying Sampling Errors and Bias**

Determine whether each sample may be biased. Explain

1. Mr. Chu puts the names of all his students in a hat and chooses 12 names without looking. He surveys these students about the amount of time they spend studying.

\_\_\_\_\_

2. The editor of a computer magazine wants to know how much time the average American spends surfing the Web. The editor sends a survey to 2000 people who subscribe to the magazine.

\_\_\_\_\_

\_\_\_\_\_

Determine whether each survey question may be biased. Explain.

3. Do you prefer the new and improved Tasty-O's or the original version?

\_\_\_\_\_

4. Which candidate will you vote for in the upcoming mayoral election?

\_\_\_\_\_

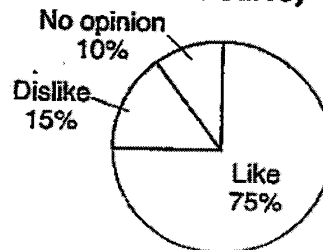
Alicia wants to know what students at her school think of the film *Hero-Man III*. Use the information below and the graph to answer each question.

**Sample:** 80 students chosen at random from the school directory

**Question:** What is your opinion of this summer's blockbuster hit *Hero-Man III*?

**Claim:** A majority of students like the film.

Results:  
**Movie Survey**



5. Is the sample or question biased? Why?

\_\_\_\_\_

\_\_\_\_\_

6. Is Alicia's claim valid? Why or why not?

\_\_\_\_\_



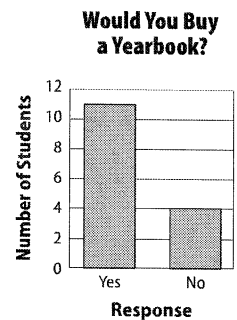
# Lesson 5 Homework Practice

## Using Sampling to Predict

Identify each sample as *biased* or *unbiased* and describe its type. Explain your reasoning.

1. To determine how many people in a town support a new tax levy, 200 people are randomly selected from a phone book and then surveyed over the phone.
2. To determine the number of households in a town that recycle, 40 households from the same street are polled.
3. To determine the usual demand of a Web site, the number of users currently visiting the Web site is recorded every hour.

4. The yearbook staff wanted to find out how many students would buy a yearbook. So, the staff surveyed 15 students who were in the school library after school. The results are in the graph. Is this sampling method valid? If so, about how many of the 1287 students in the school will buy yearbooks?



5. A library would like to see how many of its patrons would be interested in regularly checking out books from an enlarged print section. They randomly surveyed 200 patrons and 6 patrons responded that they would regularly check out books from an enlarged print section. If the library has a total of 3200 patrons, how many people can they expect to regularly check out books from an enlarged print section?

# Lesson 1 Homework Practice

## Measures of Center

Find the mean, median, and mode for each set of data. If necessary, round to the nearest tenth.

1. 4, 6, 12, 5, 8

2. 16, 18, 15, 16, 21, 16

3. 55, 46, 50, 42, 39

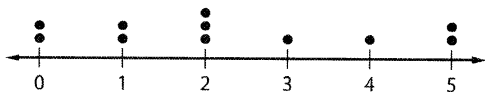
4. 17, 16, 13, 17, 17, 10, 10, 13, 10

5. 25, 25, 25, 20

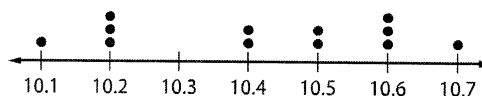
6. 3.1, 4.5, 4.5, 4.3, 6.0, 3.2

Find the mean, median, and mode for each set of data. If necessary, round to the nearest tenth.

7.



8.



9. The table below shows the number of tornadoes reported in the United States from 1997–2007. Find the mean, median, and mode for the number of tornadoes. If necessary, round to the nearest tenth.

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Number of Tornadoes	1148	1417	1342	1071	1216	941	1367	1819	1264	1106	1074

10. The following set of data shows the number of students per teacher at different elementary schools in one school district. Which measure of center best represents the data? Justify your selection and then find the measure of center.

13, 15, 11, 15, 20, 14, 16, 16, 13, 17

**LESSON**  
**9-4**

**Practice A**  
**Measures of Central Tendency**

Find the mean, median, mode, and outliers of each set of numbers.

1. 4, 2, 6, 29, 3, 8, 6, 6

mean: \_\_\_\_\_ mode: \_\_\_\_\_

median: \_\_\_\_\_ outliers: \_\_\_\_\_

2. 2, 42, 8, 6, 9, 8, 7, 9, 8

mean: \_\_\_\_\_ mode: \_\_\_\_\_

median: \_\_\_\_\_ outliers: \_\_\_\_\_

3. 12, 14, 22, 3, 11, 14, 15

mean: \_\_\_\_\_ mode: \_\_\_\_\_

median: \_\_\_\_\_ outliers: \_\_\_\_\_

4. 89, 45, 68, 94, 70, 94, 86

mean: \_\_\_\_\_ mode: \_\_\_\_\_

median: \_\_\_\_\_ outliers: \_\_\_\_\_

Determine and find the most appropriate measure of central tendency or range for each situation. Refer to the table.

5. What number best describes the middle of the waterfall heights?

\_\_\_\_\_

6. What number appears most often in the waterfall heights?

\_\_\_\_\_

7. Which measure of central tendency is best to describe the waterfall heights? Explain your reasoning.

\_\_\_\_\_

8. Johana collected checks for a local charity. Find the weighted average of each check. (*Hint:* Multiply each check amount by the corresponding number of checks. Then divide by the total number of checks.)

Waterfall Heights (ft)	
Feather, CA	640
Bridalveil, CA	620
Ribbon, NV	1,612
Seven, CO	300
Akaka, HI	442
Shoshone, ID	212
Taughannock, NY	215
Multnomah, OR	620

Checks for Charity			
Amount	\$15	\$20	\$30
Number of Checks	2	3	1

\_\_\_\_\_

## Lesson 9 -4 Practice B

### *Measures of Central Tendency*

Identify the outlier in the data set, and determine how the outlier affects the mean, median, mode and range of the data set.

1. 7, 7, 4, 9, 6, 26, 4, 5, 8, 4

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. 31.3, 1.2, 5.8, 3.7, 9.7, 5.5, 0.3, 8.1

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Determine and find the most appropriate measure of central tendency or range for each situation. Refer to the table at the right for Exercises 3–5.

3. Which measure best describes the middle of the data?

\_\_\_\_\_

4. Which earthquake magnitude occurred most frequently?

\_\_\_\_\_

5. How spread out are the data?

\_\_\_\_\_

**Some Major Earthquakes in United States History**

Year	Location	Magnitude
1812	Missouri	7.9
1872	California	7.8
1906	California	7.7
1957	Alaska	8.8
1964	Alaska	9.2
1965	Alaska	8.7
1983	Idaho	7.3
1986	Alaska	8.0
1987	Alaska	7.9
1992	California	7.6

6. A restaurant offers 3 meals at \$12 each, 8 meals at \$8 each, and 6 meals at \$7 each. Calculate the weighted average price per meal, to the nearest cent. (*Hint:* Multiply each price by the corresponding number of meals. Then divide by the total number of meals.)

## Lesson 2 Reteach

### Measures of Variability

Measures of variability are used to describe the distribution of the data.

Measure of Variability	Definition
range	difference between the greatest and the least values of the set
median	value that separates the data set in half
lower quartile	median of the lower half of a set of data
upper quartile	median of the upper half of a set of data
interquartile range	difference between the upper quartile and the lower quartile
outlier	data that are more than 1.5 times the value of the interquartile range beyond the quartiles

**Example** Find the range, interquartile range, and any outliers for the set of data in the list below.

{3, 12, 17, 2, 21, 14, 14, 8}

**Step 1** List the data from least to greatest. The range is  $21 - 2$  or 19. Then find the median.

2 3 8 12 14 14 17 21  
                                   ↑  
 median =  $\frac{14 + 12}{2}$  or 13

**Step 2** Find the upper and lower quartiles.

2 3 8 12 14 14 17 21  
           ↑          ↑          ↑  
 LQ =  $\frac{3 + 8}{2}$     median    UQ =  $\frac{14 + 17}{2}$   
           or 5.5                                    or 15.5

The interquartile range is  $15.5 - 5.5$  or 10. There are no outliers.

### Exercises

For Exercise 1, use the data in the table at the right.

- Find the range, median, upper quartile, lower quartile, interquartile range, and any outliers for each set of data.

Average Extreme July Temperatures in World Cities			
Low Temps.		High Temps.	
50	51	64	67
51	59	69	79
64	70	81	81
70	73	83	83
74	75	84	88
75	76	90	91
78	79	92	95
80		107	

# Lesson 2 Homework Practice

## Measures of Variability

Find the measures of variability and any outliers for each set of data.

1. {3, 9, 11, 8, 6, 12, 5, 4}
2. {8, 3, 9, 14, 12, 11, 20, 23, 5, 26}
3. {42, 50, 46, 47, 38, 41}
4. {10.3, 9.8, 10.1, 16.2, 18.0, 11.4, 16.0, 15.8}
5. {107, 82, 93, 112, 120, 95, 98, 56, 109, 110}
6. {106, 103, 112, 109, 115, 118, 113, 108}

7.

Fossils in Museum Exhibits	
64	67
69	79
81	81
83	83
84	86
90	91
92	95

8.

Dollars Earned	
30	31
36	38
44	52
73	73
89	

9.

Daily Sit-ups	
56	57
60	61
61	64
68	68
69	70
72	73
75	76
77	

For Exercises 10–12, use the data in the table at the right.

10. What is the range of populations shown?
11. What is the interquartile range for the annual growth rate?
12. Where does the city with the fastest growth rate fall in terms of population? The city with the slowest growth rate?

Populations of the World's Largest Cities 2000		
City	Population millions	Annual Growth Rate (%)
Tokyo, Japan	26.4	0.51
Mexico City, Mexico	18.1	1.81
Mumbai, India	18.1	3.54
Sao Paulo, Brazil	17.8	1.43
New York City, U.S.	16.6	0.37
Lagos, Nigeria	13.4	5.33
Los Angeles, U.S.	13.1	1.15
Calcutta, India	12.9	1.60
Shanghai, China	12.9	-0.35
Buenos Aires, Argentina	12.6	1.14

## Lesson 3 Reteach

### Mean Absolute Deviation

The **mean absolute deviation** is the average distance between each data value and the mean.

**Example** The table shows the weights of several of the football players on a junior high school football team. Find the mean absolute deviation. Describe what it represents.

Football Players' Weights (pounds)							
118	148	173	156	202	194	175	138

**Step 1** Find the mean.

$$\frac{118 + 148 + 173 + 156 + 202 + 194 + 175 + 139}{8} = 163$$

**Step 2** Find the absolute value of the differences between each data value and the mean.

$$\begin{aligned} |118 - 163| &= 45 & |148 - 163| &= 15 & |173 - 163| &= 10 & |156 - 163| &= 7 \\ |202 - 163| &= 39 & |194 - 163| &= 31 & |175 - 163| &= 12 & |138 - 163| &= 25 \end{aligned}$$

**Step 3** Find the average of the absolute values.

$$\frac{45 + 15 + 10 + 7 + 39 + 31 + 12 + 25}{8} = 23$$

The mean absolute deviation is 23. This means that the average distance between the mean weight and the actual weights is 23 pounds.

### Exercises

Find the mean and the mean absolute deviation of each data set.

1. 9   5   14   16   10

2. 4   6   11   1   0   7   8   2   12   3

3. -4   3   -1   2.5   6.5

4. 77   70   80   67   89   77   76   82

5. -1125   -1004   -989   -1222

# Lesson 3 Homework Practice

## Mean Absolute Deviation

Find the mean and the mean absolute deviation of each data set.

1. 6 8 0 5 1

2. 26 13 6 3 20 10 -4 -2 15 7.5

3. 7.3 0.1 9.5 4.5 -5 -1 2 1

4. The number of fish in 7 aquariums is 4, 9, 15, 8, 7, 3 and 10. Find the mean absolute deviation. Round to the nearest hundredth. Describe what the mean absolute deviation represents.

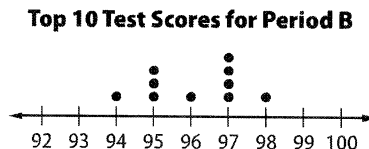
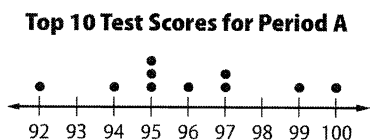
5. The populations for the five largest Florida cities are shown in the table to the right. Find the mean and the mean absolute deviation (rounded to the nearest whole number). Describe what the mean absolute deviation represents.

City	Population
Jacksonville	821,784
Miami	399,457
Tampa	335,709
St. Petersburg	244,769
Orlando	238,300

6. The prices for a gallon of regular gasoline at six area gas stations are listed below. Find the mean absolute deviation (rounded to the nearest cent). Describe what the mean absolute deviation represents.

\$3.59 \$3.79 \$3.74 \$3.57 \$3.83 \$3.62

7. The dot plots below show the top ten test scores for each of Mrs. Winthrop's Period A and Period B science classes. Predict which data set has a smaller mean absolute deviation. Justify your answer.



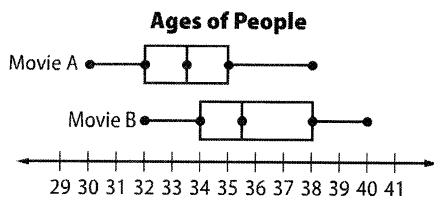


# Lesson 4 Reteach

## Compare Populations

**A box plot** uses a number line to show the distribution of a set of data. **A double box plot** consists of two box plots graphed on the same number line. You can draw inferences about two populations in a double box plot by comparing their centers and variability.

**Example** The double box plot shows the ages of people at two different movies. Compare their centers and variability. Write an inference you can draw about the two populations.



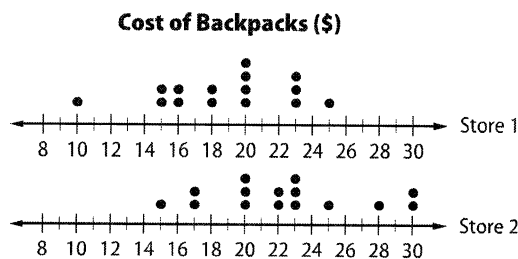
Examine the shape of the data. Neither box plot is symmetric. Use the median to compare the centers and the interquartile range to compare the variability.

	Movie A	Movie B
<b>Median</b>	33.5	35.5
<b>Interquartile Range</b>	35 – 32, or 3	38 – 34, or 4

The median age for people attending Movie B is 2 years older than those attending Movie A. There is a greater spread of data around the median for the ages of people in Movie B. Overall, the people who attended Movie B are older than those who attended Movie A.

### Exercise

- The double dot plot below shows the cost of backpacks at two different stores. Compare the centers and variability of the two populations. Write an inference you can draw about the two populations.

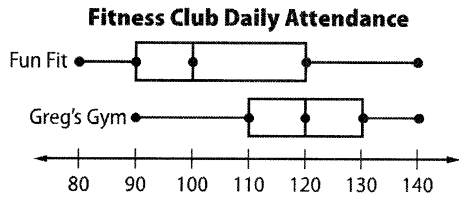


# Lesson 4 Homework Practice

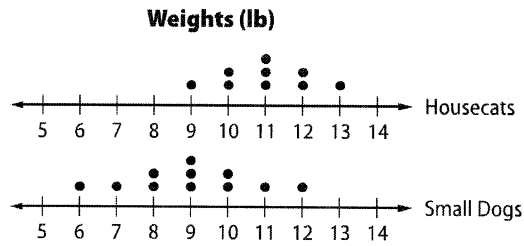
## Compare Populations

Compare the centers and variability of the two populations in each exercise. Round to the nearest tenth if necessary. Write an inference you can draw about the two populations.

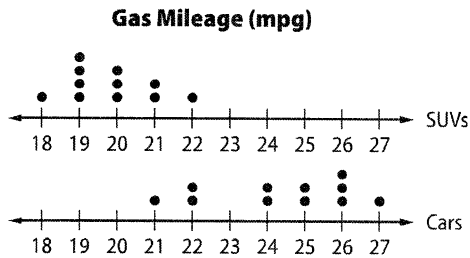
1. The double box plot shows the daily attendance for two fitness clubs for one month.



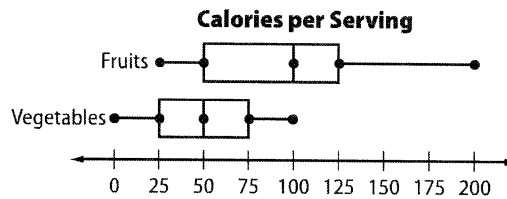
2. The double dot plot shows the weights in pounds of several housecats and small dogs.



3. The double dot plot below shows the gas mileage, in miles per gallon, for several cars and SUVs.



4. The double box plot shows the number of Calories per serving for various fruits and vegetables.



**LESSON**  
**9-6**

**Challenge**

**Double the Fun**

A double-bar graph is used to compare between data groups and within data groups.

1. In which quarter did the company experience its greatest profit? Explain.

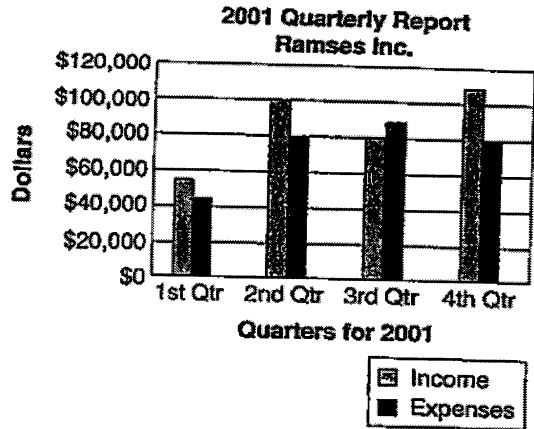
\_\_\_\_\_

\_\_\_\_\_

2. Did the company experience a profit or loss for the year? Estimate the amount.

\_\_\_\_\_

3. Make a double-bar graph to display this data.



**Baseball Home-Run Leaders, Years 1997–2001**

	1997	1998	1999	2000	2001
<b>American League</b>	56	56	48	47	52
<b>National League</b>	49	70	65	50	73


4. In which year was the difference between home-run leaders greatest?

\_\_\_\_\_

5. Compare the home-run leader data for the American League and the National League.

\_\_\_\_\_

\_\_\_\_\_

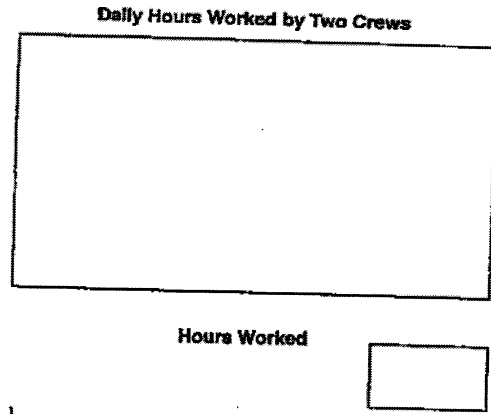
**LESSON**  
**9-6**

**Practice B**

**Displaying Data**

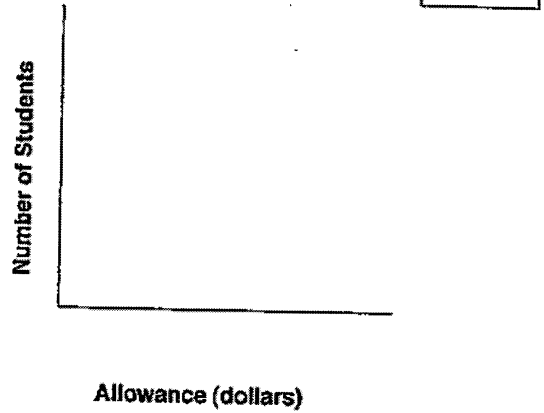
1. Make a double-bar graph.

Daily Hours Worked	6	7	8	9	10	11	12
Crew A	4	3	6	1	3	1	2
Crew B	5	5	4	3	2	0	1



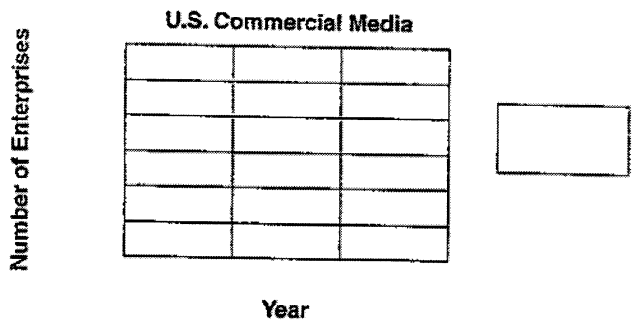
2. Use the data to make a histogram with intervals of 5.

Weekly Allowance of 20 Students			
\$5	\$15	\$2	\$10
\$12	\$12	\$10	\$15
\$10	\$5	\$6	\$4
\$8	\$7	\$20	\$7
\$5	\$4	\$5	\$9



3. Make a double-line graph of the given data. Use the graph to estimate the number of radio stations and cable TV systems in 2002.

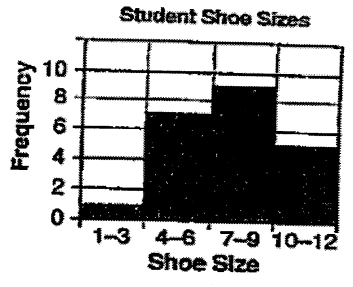
Commercial Media in the United States		
Year	Radio Stations	Cable TV Systems
1997	10,207	10,950
1999	10,444	10,700
2001	10,516	9,924
2003	10,605	9,339



**LESSON 9-7** **Practice B**  
**Analyzing Data Displays**

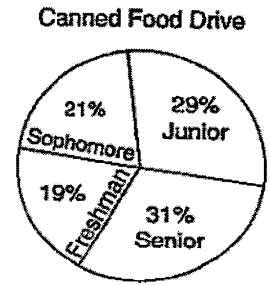
Use the histogram for Exercises 1 and 2.

1. How many students in the class wear a size 7 or greater?  
 \_\_\_\_\_
2. What is the approximate median shoe size of the students in the class?  
 \_\_\_\_\_



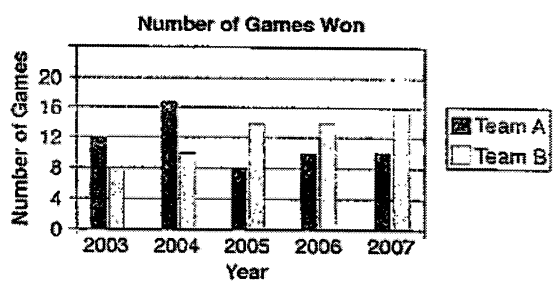
The circle graph shows the percent of canned goods collected at a school by class. There were 2,000 canned goods collected. Use the circle graph for Exercises 3 and 4.

3. How many canned goods did the Junior class collect?  
 \_\_\_\_\_
4. A Senior student claimed their class collected 620 canned goods. Is the claim valid? Explain.  
 \_\_\_\_\_  
 \_\_\_\_\_



Use the double bar graph for Exercises 5 and 6.

5. In which year was the difference between the number of games won between Team A and B the most?  
 \_\_\_\_\_
6. If the trend of the number of games won continues, which team would you expect to win more than 16 games during the 2008 season? Explain.  
 \_\_\_\_\_  
 \_\_\_\_\_



# Lesson 9-7 Practice C

## Analyzing Data Displays

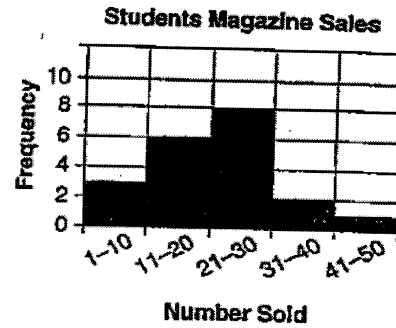
Use the histogram for Exercises 1 and 2.

1. How many students sold 21 or more magazines?

\_\_\_\_\_

2. Estimate the median number of magazines sold.

\_\_\_\_\_



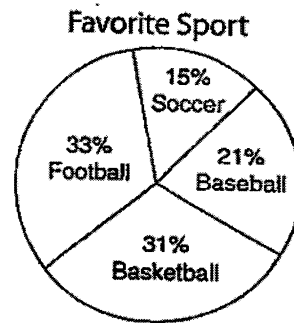
The circle graph shows the favorite sport of students. There were 1,500 students surveyed. Use the circle graph for Exercises 3 and 4.

3. How many students did not choose basketball as a favorite sport?

\_\_\_\_\_

4. A report of the survey claimed that about 500 students chose football as their favorite sport. Is this claim valid? Explain.

\_\_\_\_\_



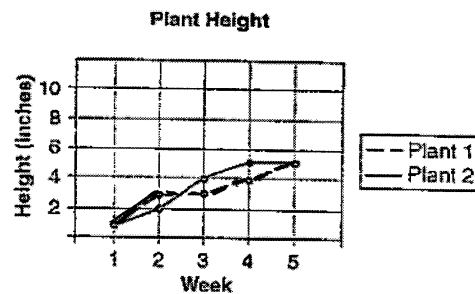
Use the double line graph for Exercises 5 and 6.

5. In which week(s) was the height of Plant 1 and Plant 2 the same?

\_\_\_\_\_

6. Plant 1 received a treatment of fertilization during the 5-week period. Between which two weeks would you predict the treatment was given? Explain.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



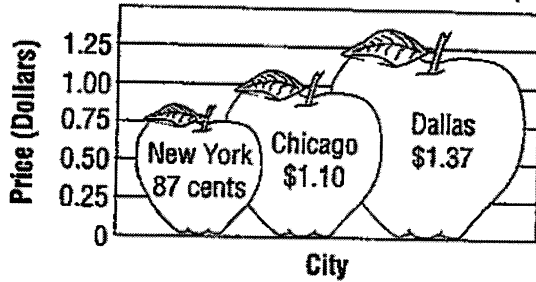
**LESSON**  
**9-8**

# Practice A

## Misleading Graphs and Statistics

Explain why each graph is misleading.

1. **The Price of a Pound of Apples in Selected Cities in September 2000**




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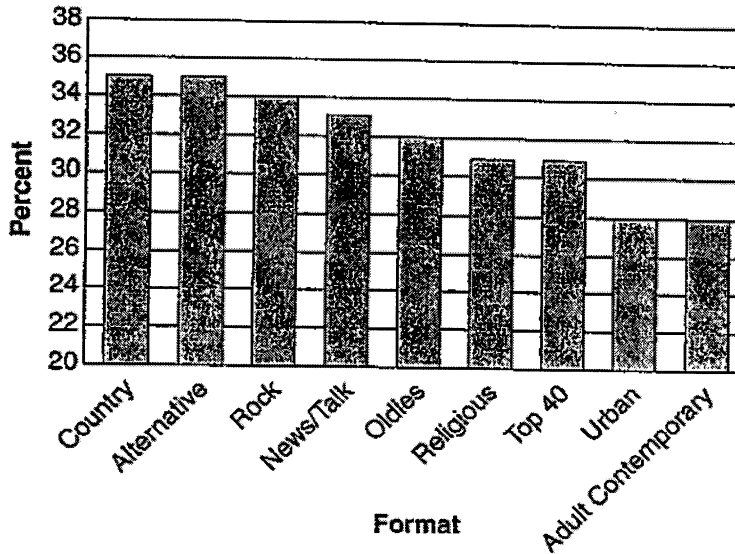
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2. **Radio Formats People Listen to Most**




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Explain why the statistic is misleading.

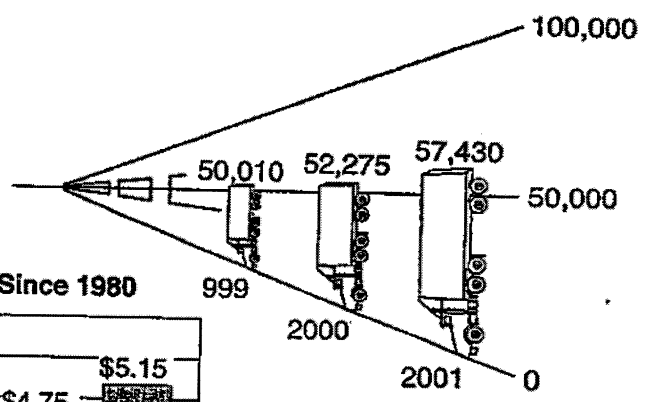
3. A juice company surveyed 4 people about which juice they preferred. Three of the people preferred the company's juice over the competition's. The company published that 3 times more people preferred their juice.

**LESSON 9-8 Practice B**  
**Misleading Graphs and Statistics**

Explain why each graph is misleading.

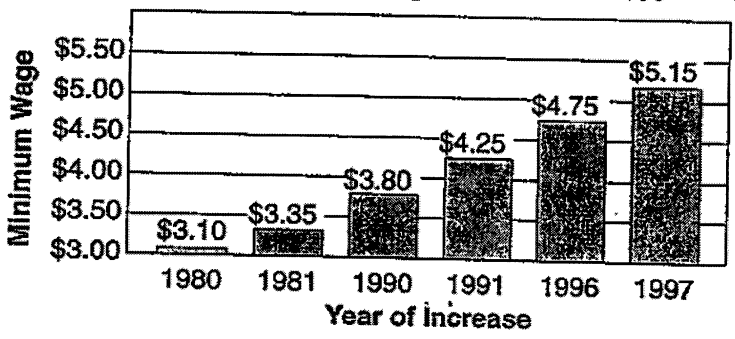
1..

**On the Road**  
**Number of Trucks that Travel City Roads**



2.

**Federal Minimum Wage Rates Since 1980**




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Explain why the statistic is misleading.

3. A chewing gum company advertises that the flavor of its new chewing gum lasts for an average of 55 minutes based on the following durations reported by customers: 12 min, 33 min, 5 min, 200 min, and 25 min.

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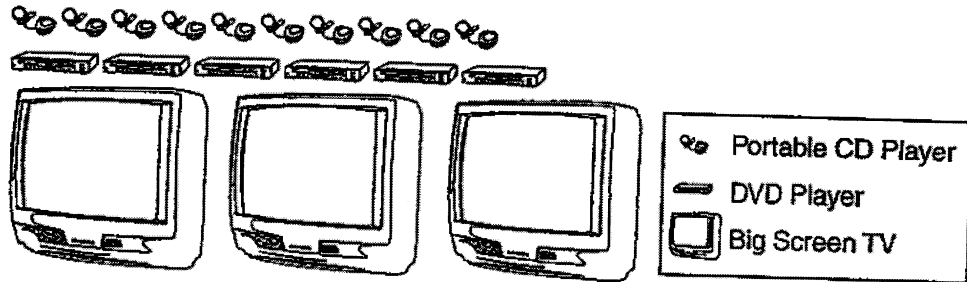
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**LESSON 9-8** **Practice C**  
**Misleading Graphs and Statistics**

Explain why each graph is misleading.

1. **Number of Units Sold**

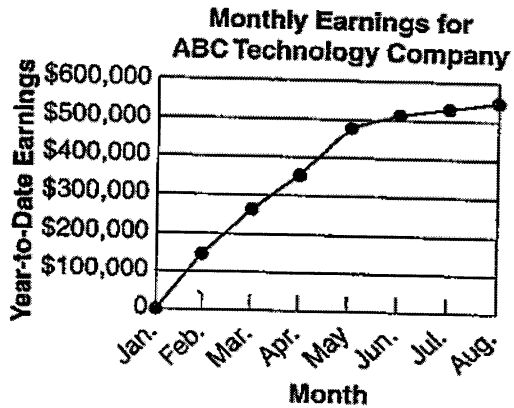
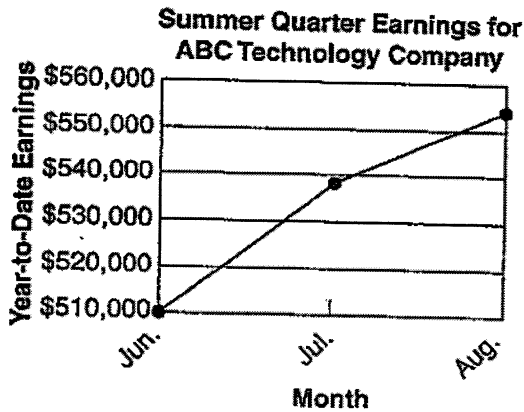


\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- 2.



\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Explain why the statistic is misleading.

3. A hotel advertises that its average monthly temperature is 78 °F. The average temperature for each month is 52 °F, 57 °F, 59 °F, 90 °F, 92 °F, 98 °F, 104 °F, 95 °F, 94 °F, 93 °F, 53 °F, and 49 °F.

\_\_\_\_\_

\_\_\_\_\_

**LESSON**  
**9-8** **Problem Solving**  
**Misleading Graphs and Statistics**

Explain why each statistic is misleading.

1. A poll taken at a college says that 38% of students like pizza the best, 32% like hamburgers the best, and 30% like spaghetti the best. They conclude that most of the students at the college like pizza the best.

\_\_\_\_\_

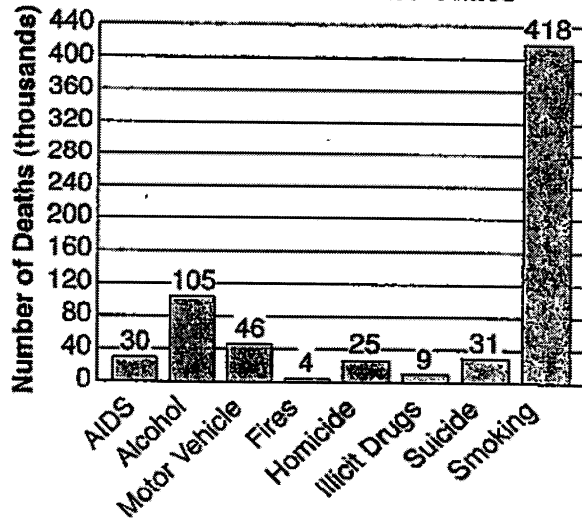
\_\_\_\_\_

3. The National Safety Council of Ireland found that young men were responsible in 57% of automobile accidents they were involved in. The NSC Web site made this claim: "Young men are responsible for over half of all road accidents."

\_\_\_\_\_

\_\_\_\_\_

**Comparative Causes of Annual Deaths in the United States**



Choose the letter for the best answer.

4. Which statement is a misleading statistic for the data in the table?

Student	Test Grade
A	85%
B	92%
C	88%
D	10%
E	80%

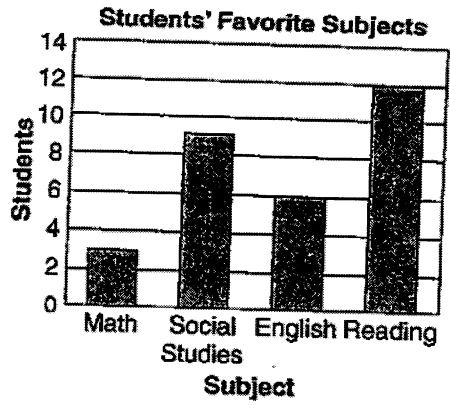
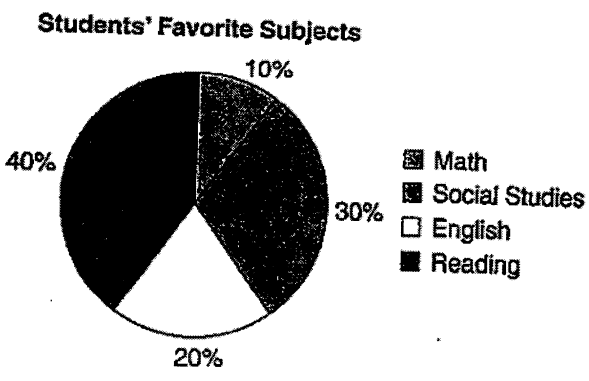
- A The median score was 85%.
- B Most students scored an 80% or above.
- C The average test score was 71%.

**LESSON**  
**9-9**

**Practice B**

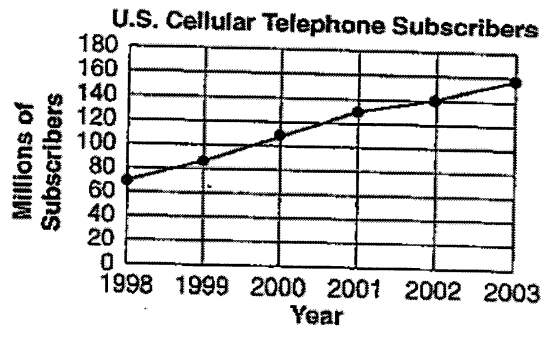
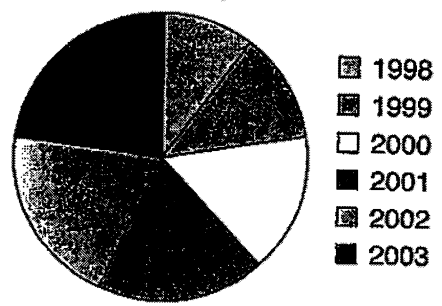
**Choosing the Best Representation of Data**

1. Which graph is a better display of the number of students in a class who chose math as their favorite subject? Explain.



2. Which graph is a better display of the change in the number of cell telephone subscribers? Explain.

**U.S. Cellular Telephone Subscribers (millions)**



3. The table shows the heights of players on a school basketball team. Choose an appropriate data display and draw the graph. How much taller was the tallest player than the shortest?

61	68	65	73

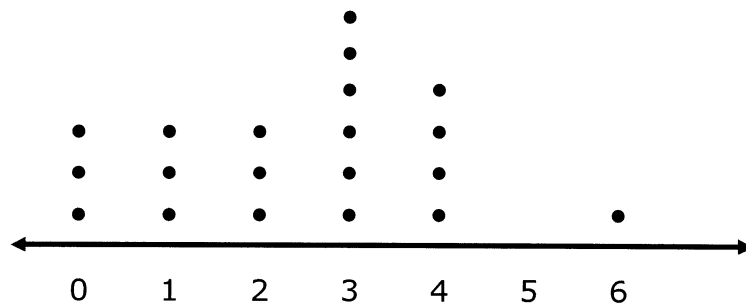
**Heights of Basketball Players (in.)**

70	64	68	71
----	----	----	----

Name \_\_\_\_\_

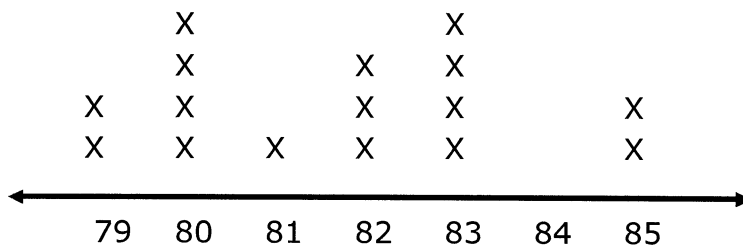
Dot Plot Worksheet

1. The students in one social studies class were asked how many brothers and sisters (siblings) they each have. The dot plot here shows the results.



- a. How many of the students have six siblings?
- b. How many of the students have no siblings?
- c. How many of the students have three or more siblings?

2. The resting pulse rates were recorded for 16 boys in gym class before they exercised. The line plot here shows the results.



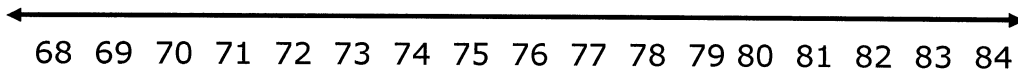
- a. What is the range of the pulse rates?
- b. How many boys had a pulse rate over 81?
- c. How many boys had a pulse rate of 83?

- d. How many boys had a pulse rate of at most 82?  
3. The height's of 20 basketball players, in inches, are given below.

**68, 70, 70, 71, 75, 80, 81, 82, 84, 75**

**75, 80, 75, 77, 75, 80, 83, 80, 71, 70**

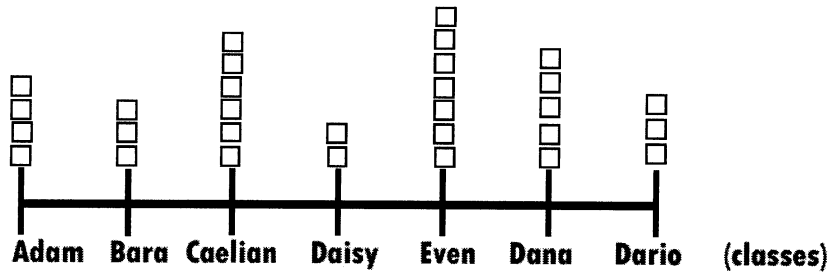
- a) Make a **dot plot** using the number line below.



- b) What is the spread (range) of the data?  
c) What is the mode of the data?  
d) How many players are greater than 70 inches tall?

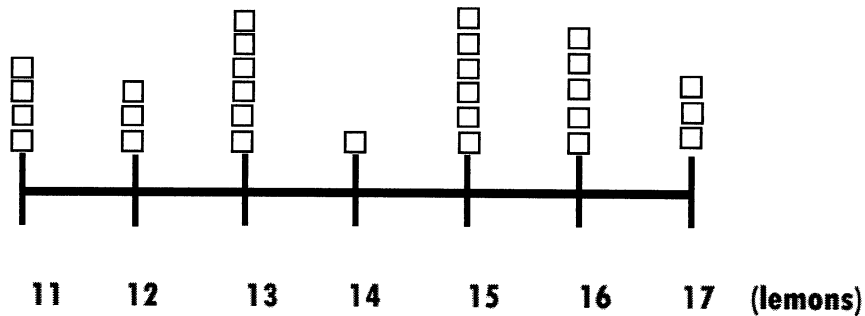
**Directions: Answer the following questions based on each of the dot plots.**

1. The dot plot below shows the number of students in each of the teacher's class.



- How many total students are there in all classes?
- Which class has the least number of students?
- Which class has the most number of students?

2. The dot plot shows the number of lemons each person has.



- How many total individuals are represented in the dot plot?
- What is the total number of lemons that the individuals have?

3. The following data shows the amount of chocolate Mrs. Latimer ate over the last 30 days. Create a dot plot to show how much chocolate she ate.

3, 5, 9, 2, 4, 5, 3, 8, 7, 4, 2, 9, 7, 1, 2, 2, 5, 7, 12, 6, 3, 7, 9, 2, 1, 7, 4, 3, 9, 11



Name : \_\_\_\_\_

### Read and Interpret the Data

Read the given stem-and-leaf plots and answer the questions.

- 1) Cups of coffee sold at a coffee vending machine outlet in two weeks are as follows.

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

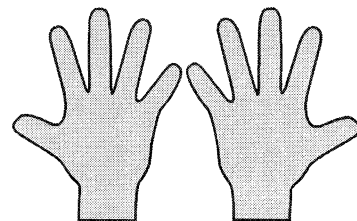


Key :  $7|2 = 72$  cups

- a) What is the maximum number of cups of coffee sold in a day? \_\_\_\_\_
- b) How many days show sales less than 60 cups? \_\_\_\_\_
- c) What is the average sales? \_\_\_\_\_

- 2) Gloves required at various departments for workers of a fertilizer factory for a month are given.

Stem	Leaf
45	0 2 4 5 8
46	0 5 5 8 9
47	2 2 2 4
48	1 1 5



Key :  $45|5 = 455$  pairs of gloves

- a) How many departments require 470 to 480 pairs of gloves? \_\_\_\_\_
- b) What is the minimum requirement? \_\_\_\_\_
- c) How many departments does the factory have? \_\_\_\_\_

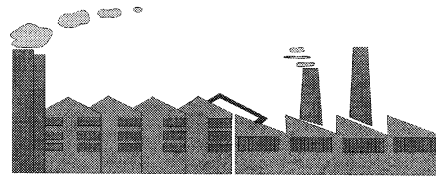
Name : \_\_\_\_\_

## Stem-and-Leaf Plot

- 1) The data for the production of number of components at an industry for three weeks are given below. Make a stem-and-leaf plot.

56, 22, 45, 24, 13, 39, 15, 34, 26, 45, 51, 18, 38, 26, 55

Stem	Leaf

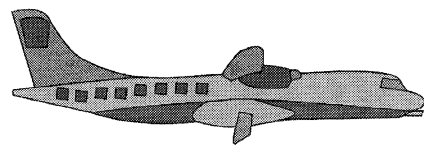


Key: 5|5 = \_\_\_\_\_

- 2) The data for air traffic in ten days at a busy airport is recorded as follows. Make a stem-and-leaf plot for the given data.

293, 287, 309, 306, 295, 288, 285, 294, 306, 281

Stem	Leaf



Key: 29|5 = \_\_\_\_\_



Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Box and Whisker Plots

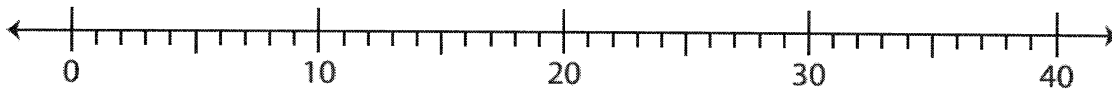
Math 7

1) Make box-and-whisker plots for the given data.

17, 29, 32, 9, 30, 14, 8, 39, 11, 32, 23

Minimum : \_\_\_\_\_ Maximum : \_\_\_\_\_

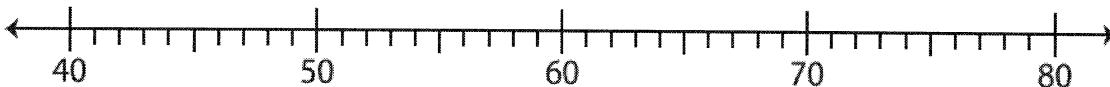
$Q_1$  : \_\_\_\_\_  $Q_2$  : \_\_\_\_\_  $Q_3$  : \_\_\_\_\_



2) 58, 67, 44, 72, 51, 42, 60, 46, 69

Minimum : \_\_\_\_\_ Maximum : \_\_\_\_\_

$Q_1$  : \_\_\_\_\_  $Q_2$  : \_\_\_\_\_  $Q_3$  : \_\_\_\_\_

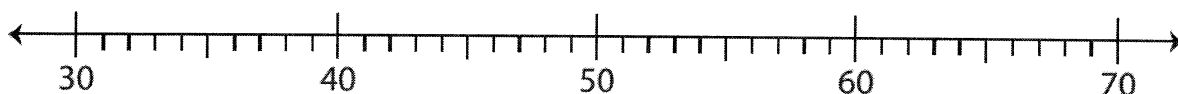


3) Eleven staff from a university visited a museum. The below given data shows their ages noted by a volunteer of the museum to issue tickets.

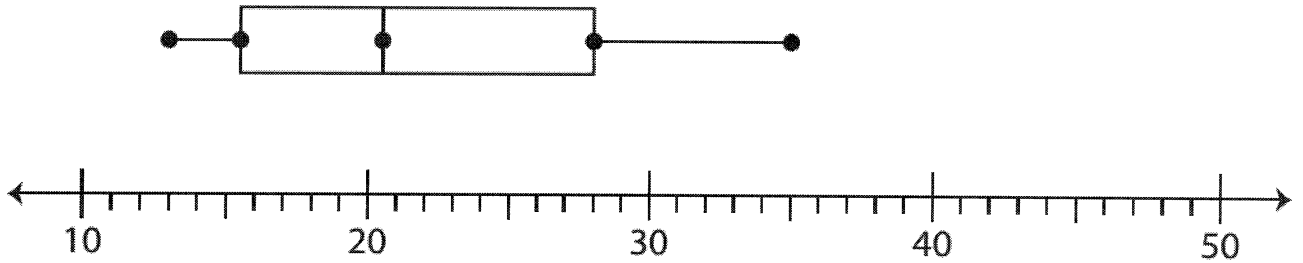
42, 46, 50, 52, 53, 50, 51, 38, 48, 47, 43

Make a box-and-whisker plot.

Min: \_\_\_\_\_,  $Q_1$ : \_\_\_\_\_,  $Q_2$ : \_\_\_\_\_,  $Q_3$ : \_\_\_\_\_, Max: \_\_\_\_\_



- 4) The incubation time (in days) of a canary, dove, mynah, penguin, parakeet, raven, chicken, cockatoo, peafowl, turkey, swan and muscovy duck are observed and a plot has been drawn. Read the plot and answer the questions.



a) Write the first quartile from the given plot.

\_\_\_\_\_

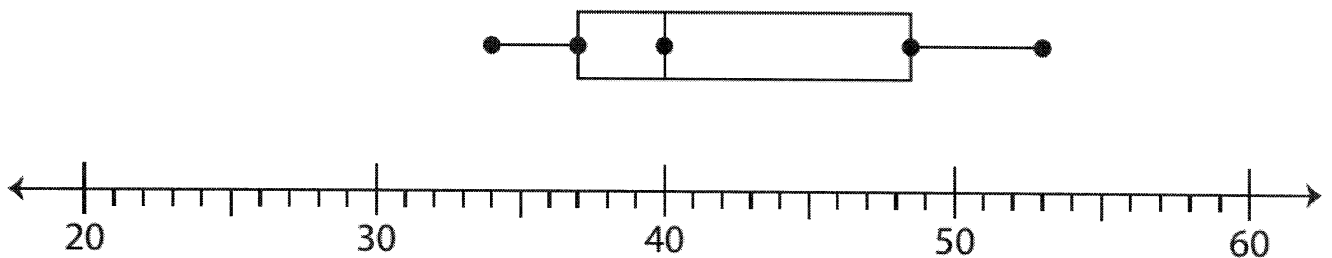
b) What is the maximum incubation time?

\_\_\_\_\_

c) What is the median?

\_\_\_\_\_

- 5) An electronic gadgets distributor distributes various brands of mobiles to retailers. The data for the number of smartphones distributed in nine months (Jan-Sep) are collected to make a box-and-whisker plot. Read the plot and answer the questions.



a) Write the median from the above given plot.

\_\_\_\_\_

b) What is the least number of smartphones distributed?

\_\_\_\_\_

c) Write the third quartile from the given plot.

\_\_\_\_\_

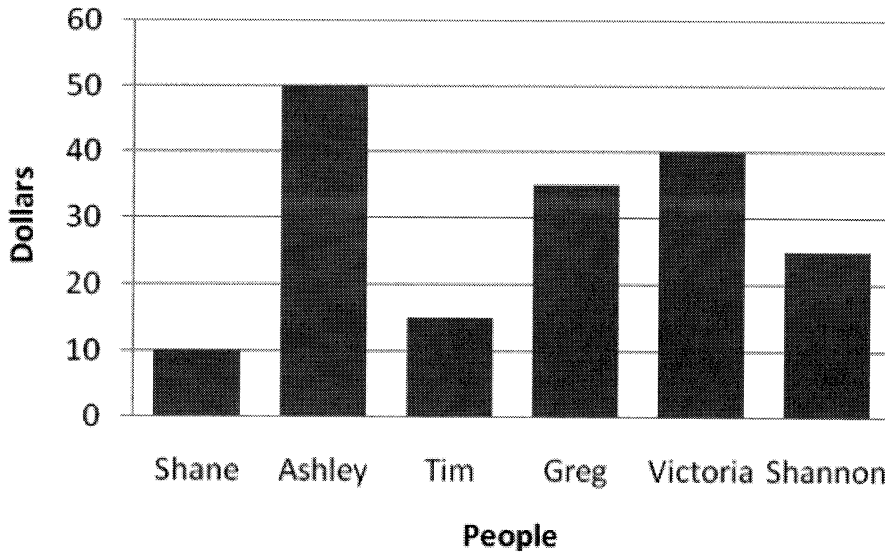
Name \_\_\_\_\_

Date \_\_\_\_\_

### Parts of a Bar and Line Graph

Draw a line to all indicated parts of the correlating graph.

#### Donations



Title

Data

Scale

Data Labels

x-axis

y-axis

Data Points

Title

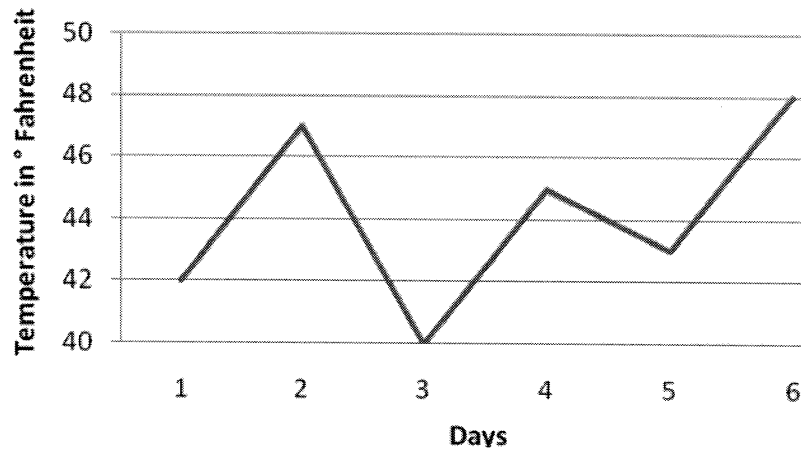
Scale

Data Labels

x-axis

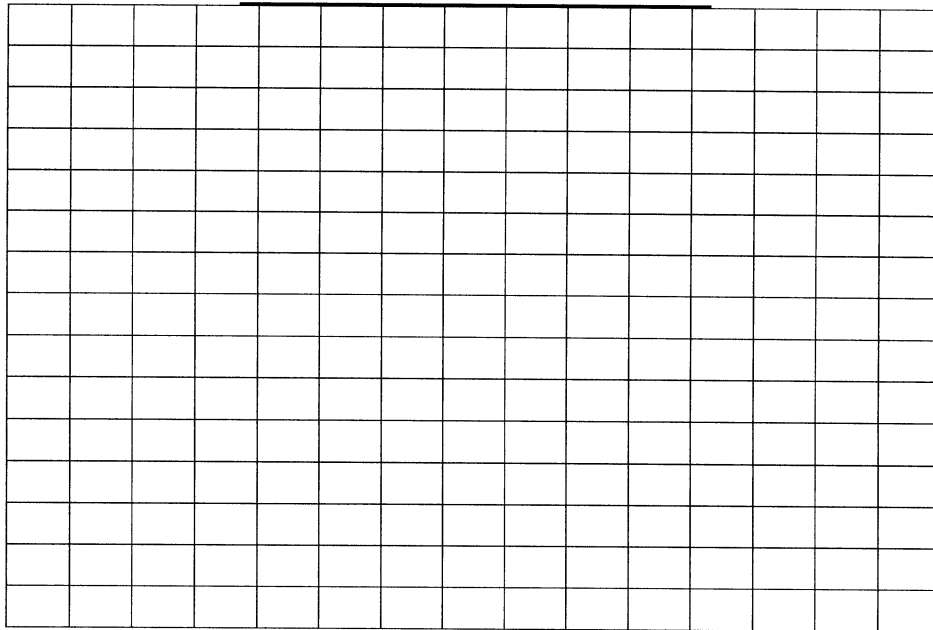
y-axis

#### Temperatures in California



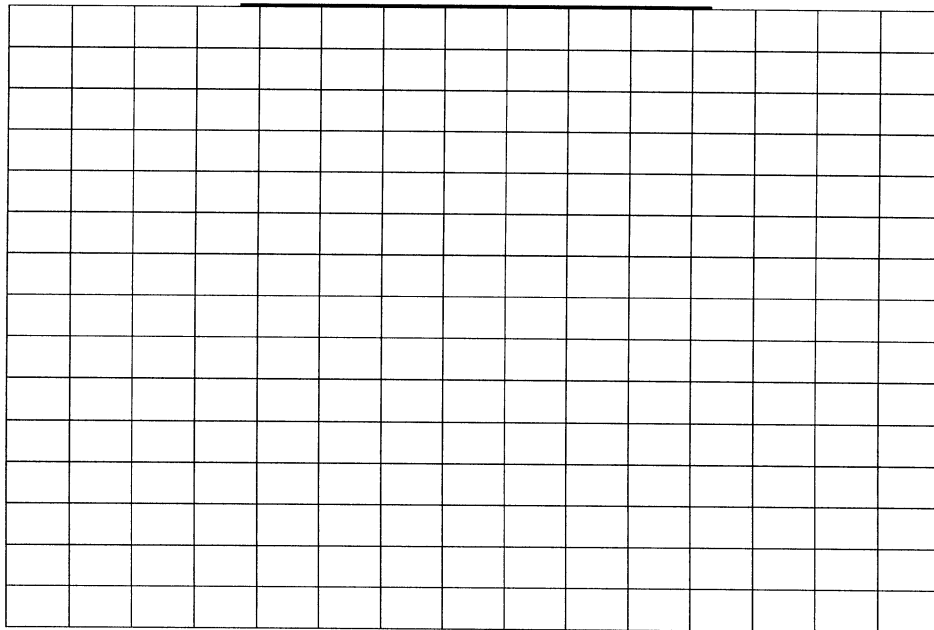
# 1 Graphing Practice: Use the data below to make a **BAR GRAPH**. Be sure to follow TAILS method and label the axes and give the graph a proper title. Your graph should use as much of the page as possible. You may use the first letter of each pet name. For example, “C” for cat.

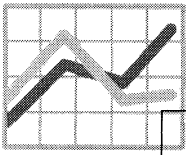
Type of Pet	# of Students
Cat	11
Dog	7
Horse	2
Rabbit	4
Ferret	1
Gerbil	4
Iguana	1
Snake	1



# 2 Graphing Practice: Use the data below to make a **LINE GRAPH**. Be sure to follow TAILS method and label the axes and give the graph a proper title. Your graph should use as much of the page as possible. **You may use the first letter of each restaurant name. For example, “A” for Arby’s.**

Restaurant Name	Average Meal Amount
Arbys	\$6.75
McDonald’s	\$4.30
Royal Farms	\$5.39
Wawa	\$6.22
Burger King	\$4.85
Hardee’s	\$6.67
Chick-Fil-A	\$7.85
Denny’s	\$8.96





NAME \_\_\_\_\_

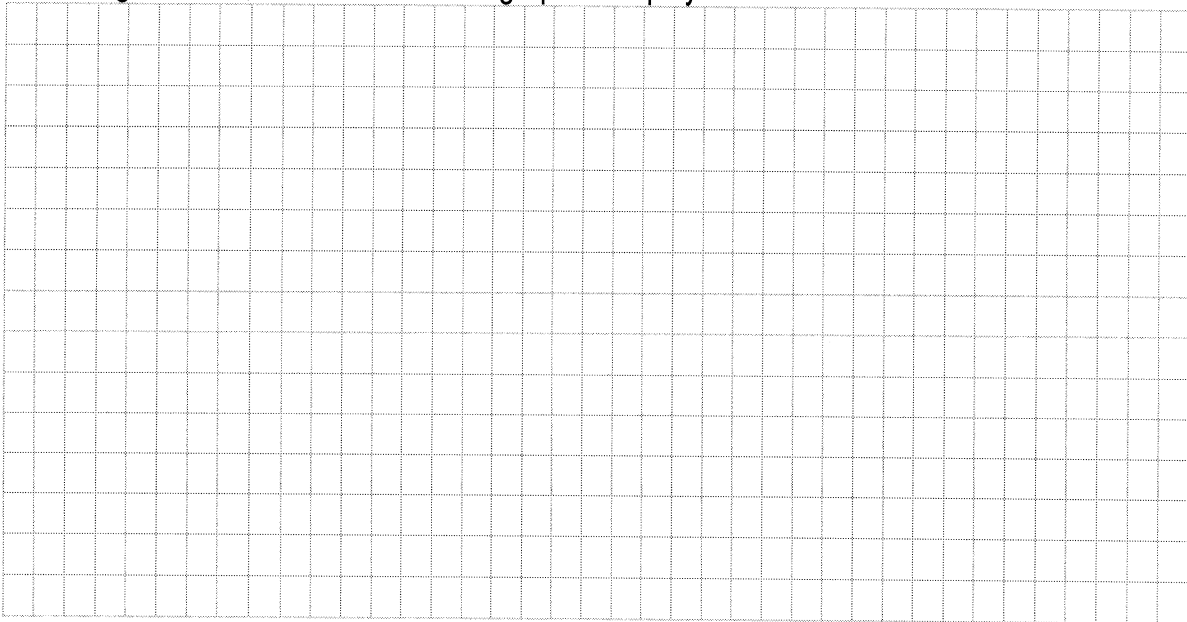
## INTERPRETING AND MAKING LINE GRAPHS

### Seeing Double

To show a change in two related quantities over a time interval, you can use a double line graph. Below you are given the height (in inches) and the age (in years) of males and females.

AGE	10	11	12	13	14	15	16	17	18	19	20	21
Height (male)	54	55	57	60	62	65	67	68	69	69	69	69
Height (female)	53	56	58	61	62	63	64	64	64	64	64	64

On the grid below, draw a double line graph to display the data.



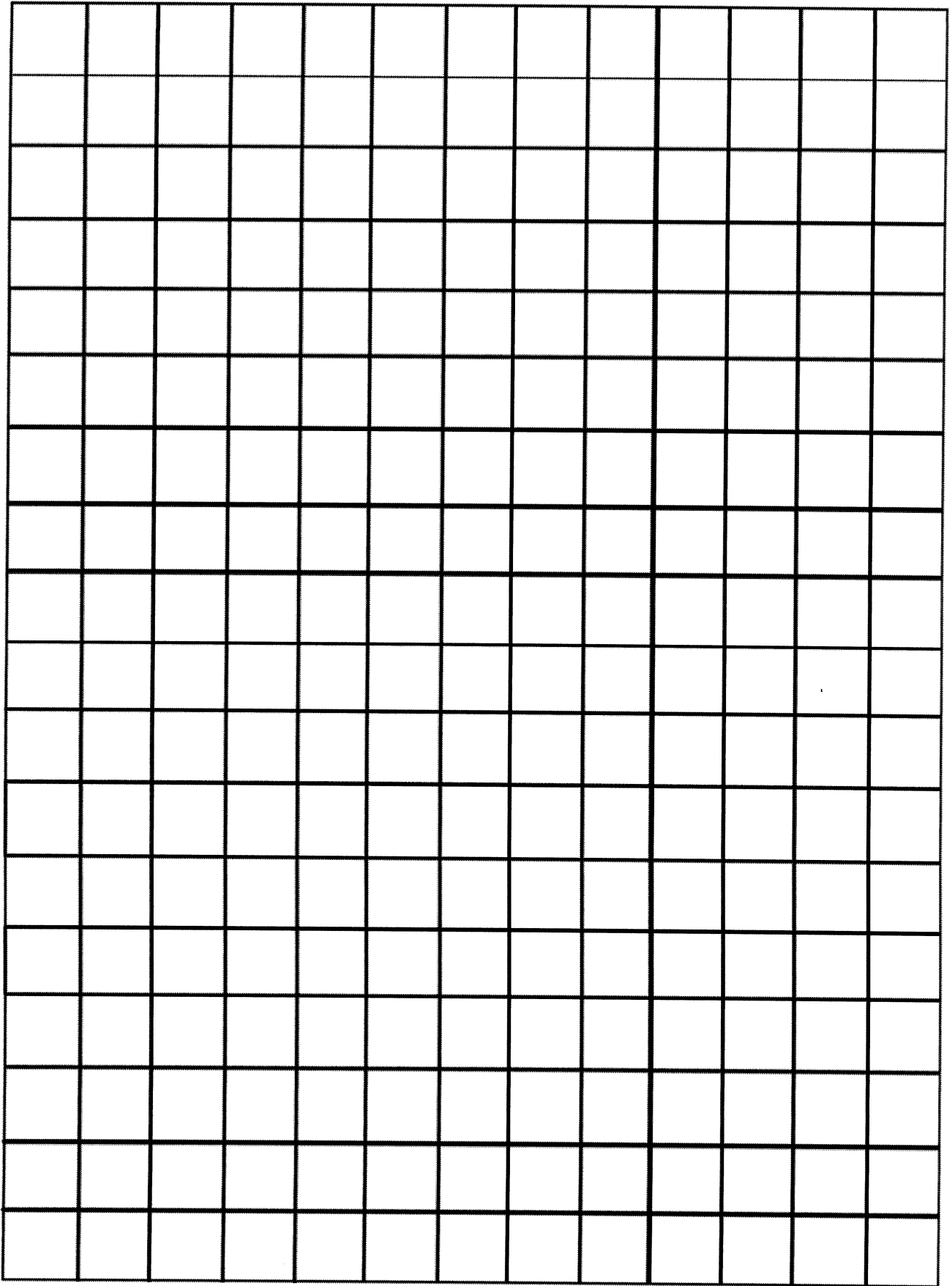
Answer the following questions.

1. How tall is the average male at 13 years? \_\_\_\_\_
2. How tall is the average female at 16 years of age? \_\_\_\_\_
3. How old is the average female who is 56 inches tall? \_\_\_\_\_
4. How old is the average male who is 65 inches tall? \_\_\_\_\_
5. At what age is the average female as tall as the average male? \_\_\_\_\_
6. At what ages is the average female as tall or taller than the average male?  
\_\_\_\_\_
7. Estimate the average height of a male at age 13.5 years. \_\_\_\_\_
8. Estimate the average height of a female at age 11.5 years. \_\_\_\_\_
9. What did you use to answer the questions above (table or graph)? Which do you think was easier? \_\_\_\_\_

# Weather Graph

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
High:							
Low:							

- Look up weather on [weather.com](http://weather.com) for: \_\_\_\_\_
- Construct a double bar graph to show the data on the chart
- Make sure to label everything





## Histograms and Dot Plots Worksheet

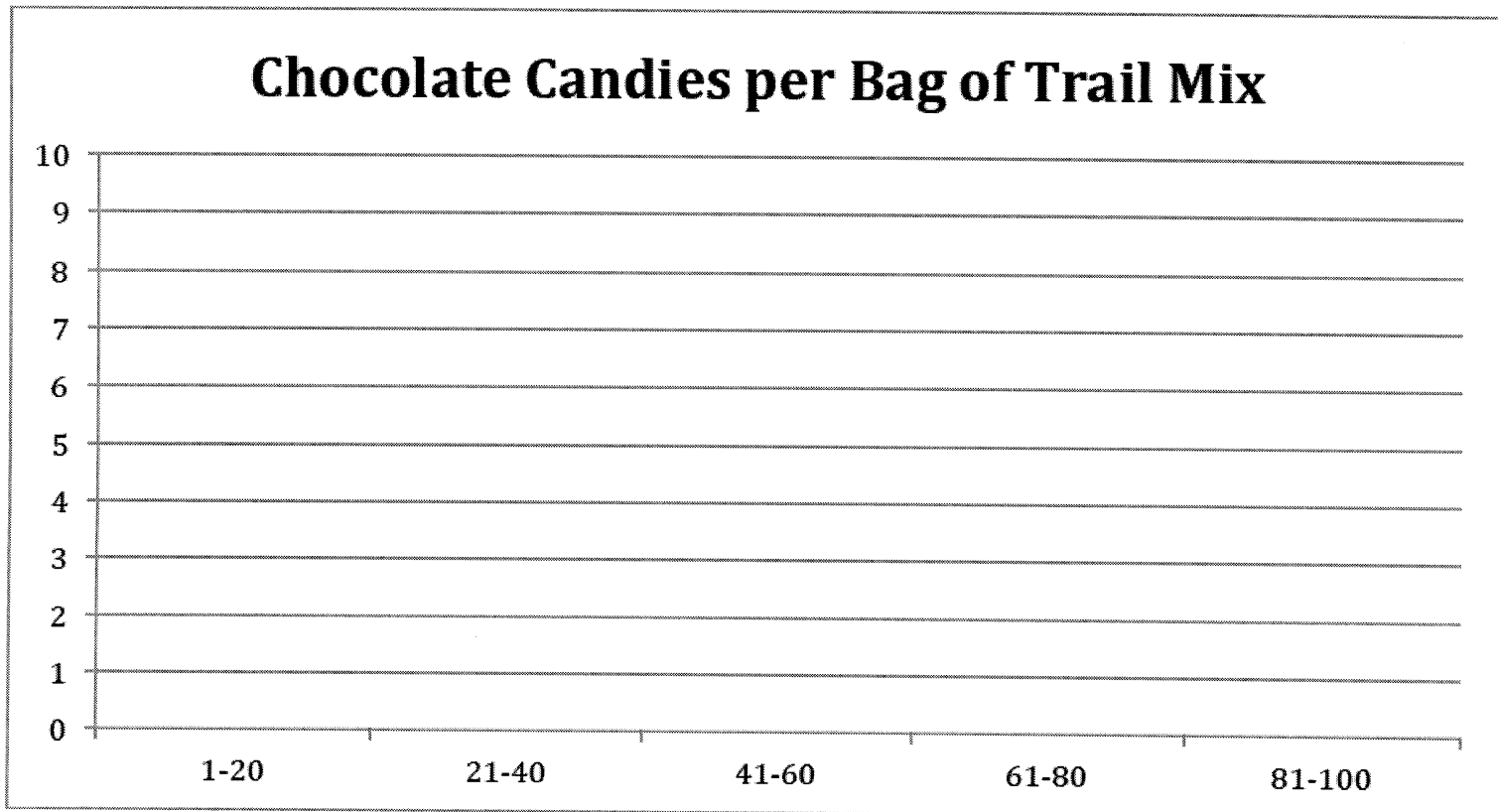
**Directions:** Create a histogram for each set of data. For the first problem, the graph is set up for you. For the second problem, you will need to determine the best way to number the axes. Do not forget to include a title as well.

1. Chocolate candies per bag of trail mix:

<b>50</b>	<b>42</b>	<b>100</b>	<b>45</b>	<b>68</b>	<b>32</b>	<b>100</b>
<b>67</b>	<b>61</b>	<b>31</b>	<b>75</b>	<b>39</b>	<b>62</b>	<b>64</b>
<b>49</b>	<b>55</b>	<b>51</b>	<b>33</b>	<b>99</b>	<b>96</b>	<b>64</b>

Frequency table:

Interval	# of values
1-20	
21-40	
41-60	
61-80	
81-100	

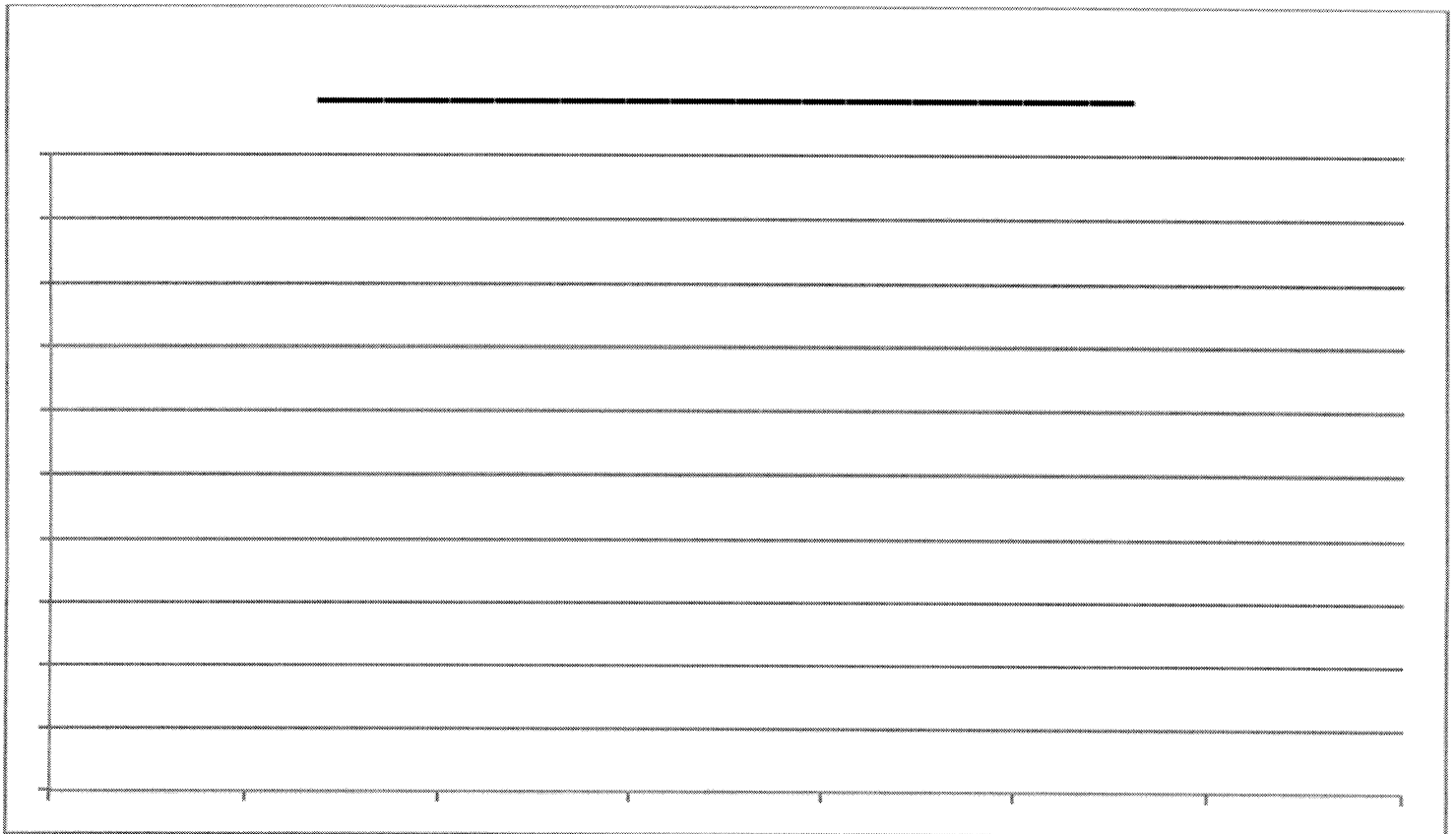


2. Test scores, out of 100 points

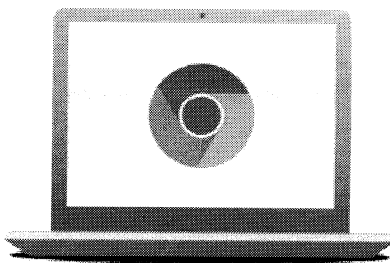
92 84 95 77 74 80 95 70 66  
73 68 90 78 64 72 78 76 65  
59 71 77 92 91 89 74 76 90

Frequency table:

Interval	# of values



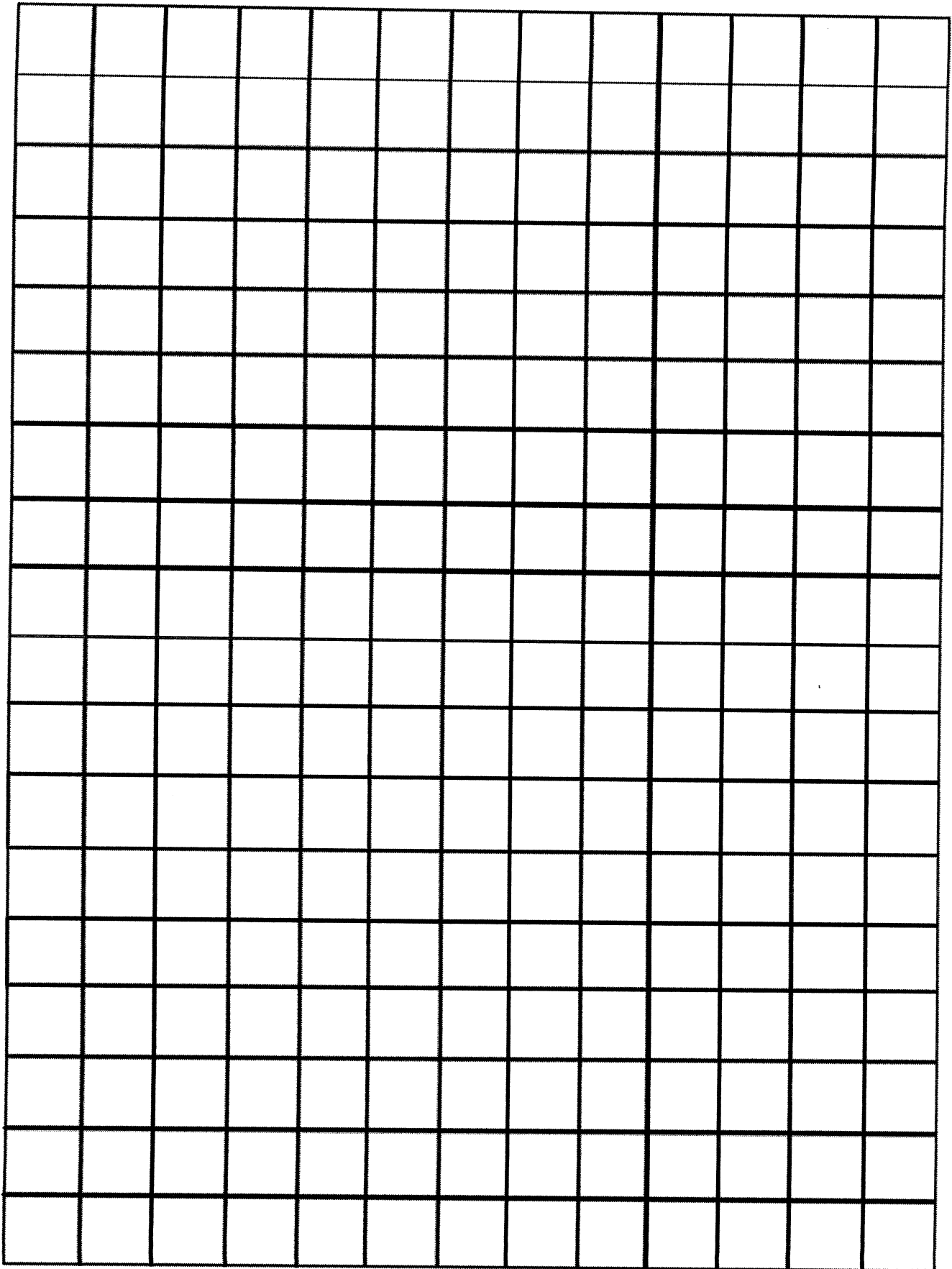
Directions:  
Create a Histogram  
using the data below



# CHROMEBOOK BATTERY PERCENTAGE

(RECORDED AT THE END OF THE DAY)

PERCENTAGE	fREQUENCY
0 – 9%	1
10 - 19%	5
20 - 29%	6
30 – 39%	8
40 – 49%	11
50 – 59%	22
60 – 69%	26
70 – 79%	19
80 – 89%	4
90 – 99%	0



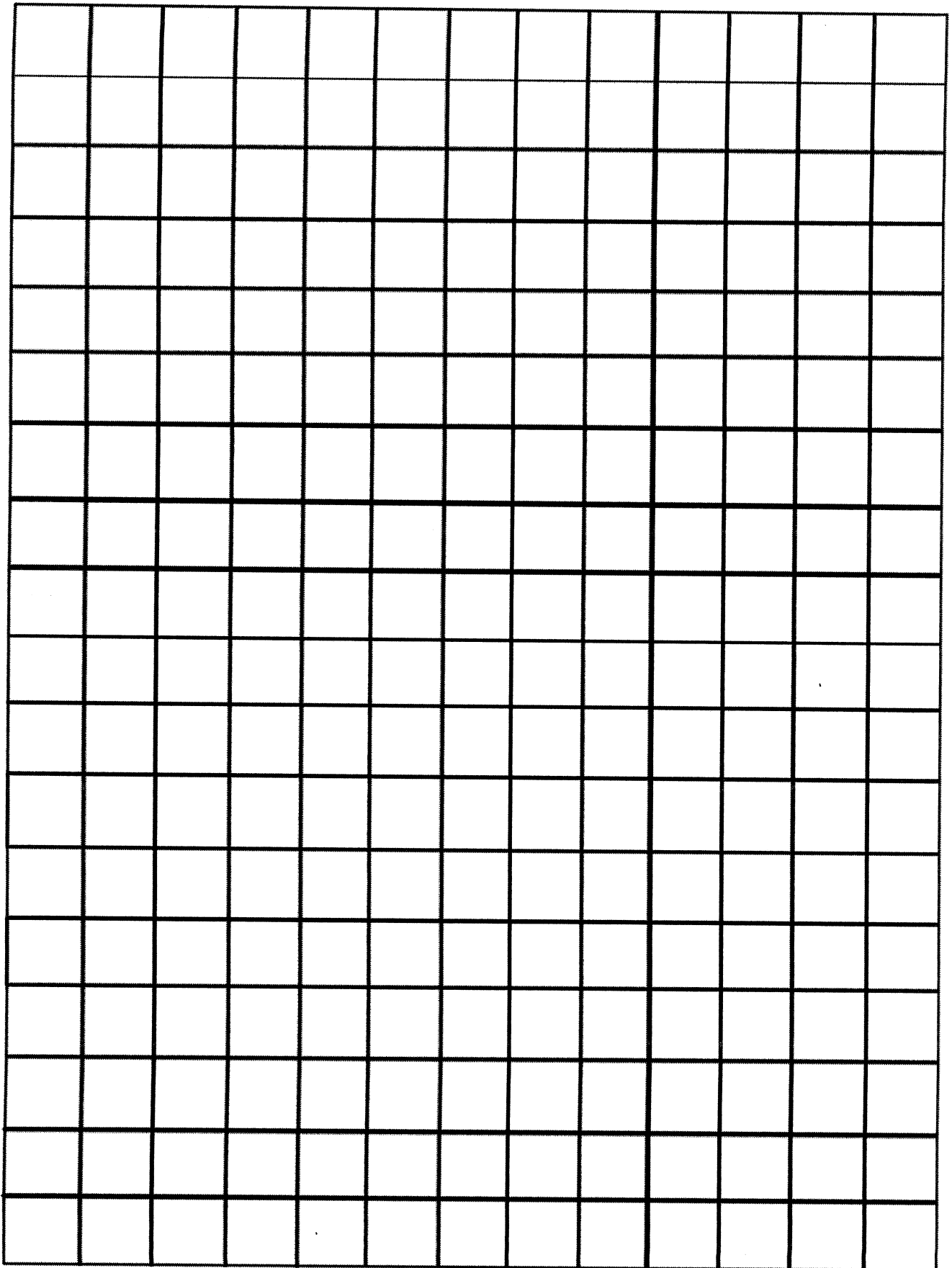
Directions:  
Create a Histogram  
from the data below



# SUGAR IN SODA

(FROM A RANKING OF THE TOP 32 SODAS)

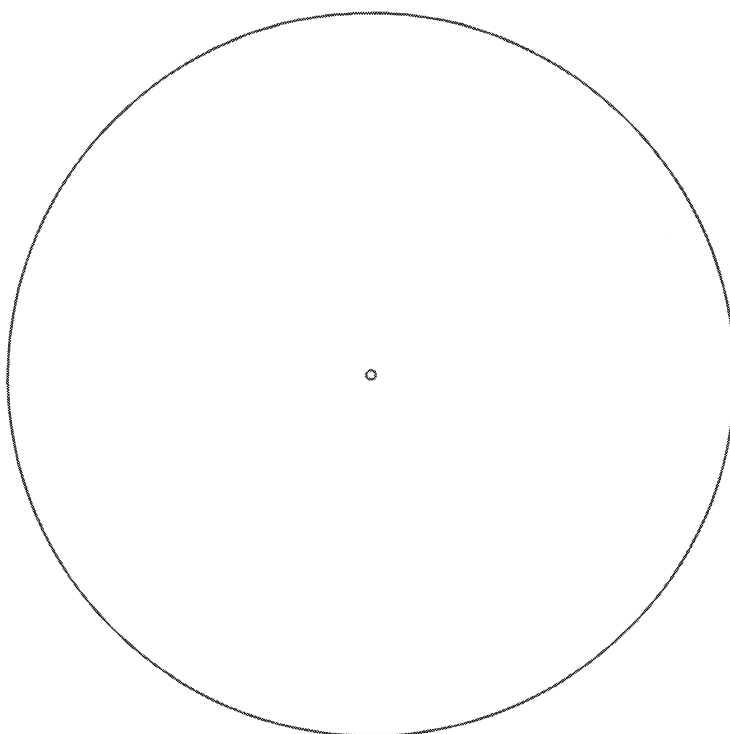
GRAMS of SUGAR	FREQUENCY
26 - 29	2
30 - 33	1
34 - 37	2
38 - 41	9
42 - 45	11
46 - 49	7



Name \_\_\_\_\_

Date \_\_\_\_\_

Type of Data	Frequency	Percent Proportion	Percent	Central Angle Proportion	Central Angle



## Notes Section:



### **Venn Diagrams**

Directions: Draw a Venn Diagram to solve each problem below. Show all work on a separate piece of paper.

1. Five of the people in Ian's office have seen a crab. 6 people have seen an octopus, and 3 people have seen both a crab and an octopus. How many people have seen a crab or an octopus or both?
  2. Eight of the people on Brenda's street have been to Louisiana and 9 have been to Tennessee. 4 people have been to both Louisiana and Tennessee. How many people have been to Louisiana but not Tennessee?
  3. Nine of the people in Keith's office can play the violin. 6 people can play the piano, and 5 people can play both the violin and the piano. How many people can play the piano but not the violin?
  4. Of the students in Erik's class, 5 like to watch hockey and 5 like to watch gymnastics. Three students like to watch both hockey and gymnastics.
    - a) How many students like to watch gymnastics only?
    - b) How many students like to watch hockey only?
    - c) How many students like to watch hockey or gymnastics or both?
  5. Tom helped his mother do two chores this week, the laundry and the dinner dishes. Five days this week he did the dinner dishes, two days this week he did both the dishes and the laundry. How many days did he do just the laundry?
  6. Out of forty students, 14 are taking English Composition and 29 are taking Chemistry. If five students are in both classes.
    - a) how many students are in neither class?
    - b) What is the probability that a randomly-chosen student from this group is taking only the Chemistry class
  7. The junior high school has a popular ski club. There are 195 students in the club. One hundred fifty students only ski and 75 only snowboard. How many students both ski and snowboard.
  8. Of 300 students surveyed, 74 said they enjoyed playing baseball only, 162 said they preferred football and ten did not like either sport. The rest said they enjoyed playing both. How many students enjoyed playing both sports?
  9. Eight students were surveyed and four students owned a cat and 4 students owned a dog. One student had both a dog and a cat. How many students did not own a pet?
-

Name \_\_\_\_\_

Date \_\_\_\_\_

Class \_\_\_\_\_

10. Today for Lunch they served hamburgers and pizza. Ten students had both. A total of 50 students had pizza. A total of 40 students had hamburgers. Twenty students had neither. How many students went to lunch?
11. Of the 50 students in our math class, 25 students have Ms. Cerulli for English. Twenty have Mr. Russo for science. Fifteen have both Ms. Cerulli and Mr. Russo. How many students have neither Ms. Cerulli nor Mr. Russo?
12. In a class of 50 students, 18 take Chorus, 26 take Band, and 2 take both Chorus and Band. How many students in the class are not enrolled in either Chorus or Band?
13. A veterinarian surveys 26 of his patrons. He discovers that 14 have dogs, 10 have cats, and 5 have fish. Four have dogs and cats, 3 have dogs and fish, and one has a cat and fish. If no one has all three kinds of pets, how many patrons have none of these pets?
14. A guidance counselor is planning schedules for 30 students. Sixteen students say they want to take French, 16 want to take Spanish, and 11 want to take Latin. Two take French and Latin and 3 want to take all three. Five want only Latin, and 8 want only Spanish. How many students want French only?
15. Thirty students went to Burger King after school. Two students had a burger, shake and fries. One had only fries. Four had only burgers. Six had only burgers and shakes. Five had only burgers and fries. A total of 12 students had fries. Two had nothing.
- How many students had only shakes
  - How many students had burgers?
  - How many students had shakes?
16. Roberto's Pizzeria has three types of meat toppings: pepperoni, sausage, and meatballs. One day he sold 40 pizzas. Three had all three toppings. Four had only pepperoni and sausage. Five had only sausage and meatballs, and 6 had only pepperoni on them. A total of 25 had meatballs on them. A total of 20 had pepperoni on them.
- How many pizzas had only sausage
  - How many pizzas had sausage on them?

Name \_\_\_\_\_

## GRAPHING AND PLOTTING CHECKLISTS

<p><b>Line Graph</b></p> <ul style="list-style-type: none"> <li>✓ labeled x and y axes</li> <li>✓ arrows on each axis</li> <li>✓ consistent number scales on both axes</li> <li>✓ evenly spaced tick marks</li> <li>✓ zero on both axes</li> <li>✓ labels for each number scale</li> <li>✓ title of the graph</li> <li>✓ key (for multiple line graphs)</li> <li>✓ color-coded lines (for multiple line graphs)</li> <li>✓ Space and "skip mark" before first data point if the data doesn't start at zero</li> </ul>	<p><b>Bar Graph</b></p> <ul style="list-style-type: none"> <li>✓ labeled x and y axes</li> <li>✓ arrows on each axis</li> <li>✓ number scale on y-axis</li> <li>✓ zero on y-axis</li> <li>✓ label for number scale</li> <li>✓ title of the graph</li> <li>✓ key (for multiple bar graphs)</li> <li>✓ color-coded bars (for multiple bar graphs)</li> <li>✓ BARS DO NOT TOUCH (except in multiple bar graphs...each set of bars is clumped together with space between the "clumps")</li> <li>✓ Space before first bar (and all bars)</li> </ul>
<p><b>Circle Graph</b></p> <ul style="list-style-type: none"> <li>✓ Proportional sectors based on given data</li> <li>✓ Sector labels (name, quantity, and percent)</li> <li>✓ title of the graph</li> <li>✓ Key (<i>optional...instead of labeling the sectors, each sector can be color-coded. A key would then be necessary to tell what each sector represents.</i>)</li> </ul>	<p><b>Histogram</b></p> <ul style="list-style-type: none"> <li>✓ labeled x and y axes</li> <li>✓ arrows on each axis</li> <li>✓ number scale for frequency on y-axis</li> <li>✓ label for type of frequency (be specific: "Frequency of...")</li> <li>✓ zero on y-axis</li> <li>✓ evenly spaced TOUCHING BARS</li> <li>✓ consistent interval labels at the base of each bar</li> <li>✓ label for x-axis ("Interval of...")</li> <li>✓ title of the graph</li> <li>✓ Space and "skip mark" before first bar if the data doesn't start at zero</li> </ul>
<p><b>Stem and Leaf Plot</b></p> <ul style="list-style-type: none"> <li>✓ Vertical line separating the stems from the leaves</li> <li>✓ Stems aren't skipped</li> <li>✓ Leaves are in order from least to greatest</li> <li>✓ Key...a statement using an example from the data which explains how to read the plot</li> </ul>	<p><b>Venn Diagram</b></p> <ul style="list-style-type: none"> <li>✓ A circle for each comparison group</li> <li>✓ A rectangle containing the circles (representing the "universe")</li> <li>✓ Circle labels</li> <li>✓ Title</li> <li>✓ Numbers (when appropriate) in each area (overlapping, non-overlapping and outside)</li> </ul>