Describing Data Notes

- A _____ is one that anticipates _____ or _____ in the answers given to the poll.
  - Example:
    - Example:
    - Non-example:
- POPULATION or TARGET GROUP: are defined by _____
  - Example: Middle School Students
- In order for _____ to accurately depict a population, the data must be collected from a _____.
  - Random Sample: _____
    _____
    _____example:
    _____
- Types of Data – there are ____.
  - Categorical: _____
    _____
    _____
    - Example:
  - Numerical:_____
    _____
    _
    - Example:

Let's practice…Identify the following as categorical or numerical

1) Height of 8th graders _____
2) Favorite brand of cereal _____
3) Birth county for a person _____
4) Cost of DVD _____
5) Number of students who made an 'A' on the last test _____
6) How many books read in the last month _____
7) Gender of the next baby born in a hospital _____
8) Actual weight of chips in the bag _____

- Ways that data can be presented….

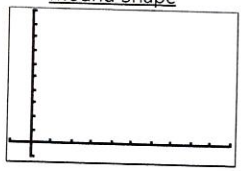
Type	Description	Picture
Frequency Table		
Line Graph		
Bar Graph		
Histogram		
Dot Plot		

Unit 8 Packet

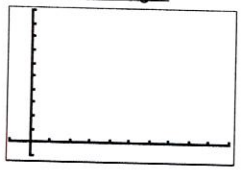
Box and Whisker Plot		

- Once your data is organized it can be described by: _____, _____, and _____.
  - Center: _____ or _____
    - Mean: _____
      - Accurate description of center if _____ is _____.
      - Affected by outliers
    - Median: _____
      - More accurate description of center when _____ is _____.
      - Not affected by _____.
  - Spread: _____ and _____
    - Range: _____
    - Interquartile Range (IQR): _____
  - Shape: _____, _____, _____, _____.
    - Examples:

Mound Shape



Skew Right



Name : _____ Score : _____

Teacher : _____ Date : _____

Mean, Mode, Median, and Range

1) 16, 18, 7 , 6 , 10, 15, 5

Mean ___ Median ___ Mode _____ Range ___

2) 8 , 9 , 19, 10, 9 , 10, 8 , 15

Mean ___ Median ___ Mode _____ Range ___

3) 14, 12, 20, 19, 17, 14

Mean ___ Median ___ Mode _____ Range ___

4) 7 , 8 , 8 , 9 , 18

Mean ___ Median ___ Mode _____ Range ___

5) 7 , 8 , 16, 15, 16, 14, 12, 16

Mean ___ Median ___ Mode _____ Range ___

6) 16, 18, 10, 17, 9

Mean ___ Median ___ Mode _____ Range ___

7) 5 , 17, 14, 18, 8 , 10

Mean ___ Median ___ Mode _____ Range ___

8) 6 , 16, 15, 11, 17, 6 , 16, 17

Mean ___ Median ___ Mode _____ Range ___

9) 11, 9 , 15, 17, 19, 13

Mean ___ Median ___ Mode _____ Range ___

10) 20, 15, 14, 18, 16, 14, 8 , 7

Mean ___ Median ___ Mode _____ Range ___

Name: _____

11.4 Random Samples and Surveys worksheet

State whether or not the sample is random. If it is not random, explain why.

1.) You survey customers at a mall. You want to know which stores they shop at the most. You walk around a computer shop and choose 20 customers there for your survey.	2.) A country radio station wants to know what the most popular type of music is, so they ask their listeners to call in to say their favorite type.
3.) You want to know what 7th graders think of their science class. You poll 100 random 7th graders.	4.) You want to survey the students in your school about their exercise habits. At lunchtime you stand by a vending machine. You survey every student who buys something from the vending machine.

State whether or not the statement is biased or fair. If it is biased, explain why.

5.) Do you want a delicious salad for lunch or the usual sandwich?	6.) Do you watch TV on Saturday like everybody else?
7.) Do you eat the recommended number of servings for fruits and vegetables?	8.) I don't like these shoes, do you?

Name: _____ Date: _____ Period: _____

Random Samples vs. Biased Samples:

Create a two-column chart in your notebook. Label the left side Random Samples and the right side Biased Samples. Cut the scenarios and place them under the corresponding side of the chart. Discuss your reasoning with your partner.

Susan wants to know the favorite sport of students in her class. She gives the student a number, puts all numbers in a hat, draws 10 numbers, and surveys those selected students.	William is surveying people at the shopping center to determine the most popular T.V show.	Carlos is at a local car dealership to survey people on the most popular car. He will ask everyone that enters the dealership for his or her favorite make of car.
Leslie wants to determine eating habits of people in her neighborhood. She asks 80 people at a neighborhood fast food restaurant about the last meal they ate.	Manny wants to determine the amount of time that 7th graders spend studying for their math exam. He surveys 80 7th grade students.	Liz wants to find out the favorite sport of girls in her school. She asks all girls on the school basketball team what's their favorite sport.

Tell whether each sample is representative of the population. If not, tell why not. (#1-7)

1. The manager of a television station wants to conduct a survey to determine what type of sports people like to watch. She surveys everyone at a basketball game.

2. The manager of a television station wants to conduct a survey to determine what type of sports people like to watch. She calls every 100th name in a telephone book.

3. You want to know what type of music students at your school like best. You ask a group of your friends which music they like best.

4. You want to know which type of food students at your school like best. You ask every 20th person in the hall.

5. You want to know how many hours students at your school spend on the computer each day. You ask students from different grades as they leave school at the end of the day.

6. You want to know how many hours students at your school exercise each week. You ask members of the soccer team exercise each week.

7. To determine whether students will attend an arts festival in the school, Manuel surveys his friends in the art club.

8. A random sample of people at the mall shows that 22 prefer to take a family trip by car, 18 prefer to travel by plane, and 4 prefer to travel by bus. If 500 are surveyed, how many should prefer to travel by car?

Name: _____ Date: _____ Period: _____

Mean Absolute Deviation Worksheet

Find the mean absolute deviation

10, 7, 13, 10, 8

Data	Mean	Difference	Positive Value
		Sum:	
		Count:	
		Mean Absolute Deviation:	

The average of the "Positive Value" column

Find the mean absolute deviation

110, 114, 104, 108, 106

Data	Mean	Difference	Positive Value
		Sum:	
		Count:	
		Mean Absolute Deviation:	

The average of the "Positive Value" column

Find the mean absolute deviation

87, 75, 85, 77, 74, 82, 90, 88, 79, 81

Data	Mean	Difference	Positive Value
		Sum:	
		Count:	
		Mean Absolute Deviation:	

The average of the "Positive Value" column

Find the mean absolute deviation

15, 17, 15, 17, 21, 17, 15, 23, 20, 18

Data	Mean	Difference	Positive Value
		Sum:	
		Count:	
		Mean Absolute Deviation:	

The average of the "Positive Value" column

MEAN ABSOLUTE DEVIATION

Q.1) Find the mean absolute deviation for the set below. S = {85, 90, 68, 75, 79}

A. 79.4
B. 6.48
C. 32.4
D. 79

Q.2) Sherrie just registered for her wedding. So far 6 items have been fulfilled on her registry. Find the mean price of the fulfilled items. $29, $58, $15, $129, $75, $22

A. 43.5
B. 129
C. 54.7
D. 114

Q.3) Find the mean absolute deviation of the fulfilled items on Sherrie's registry. $29, $58, $15, $129, $75, $22

A. 196
B. 54.7
C. 114
D. 32.67

Q.4) Family A and Family B both have 8 people in their family. The ages of each member is listed below. Which statement is correct about the variability of the two families. Family A: 35, 5, 42, 9, 16, 3, 8, 12 Family B: 1, 5, 29, 3, 7, 35, 6, 9

A. The variability is the same for both Family A and Family B because t hey have the same mean absolute deviation.
B. The variability for Family A is greater because the mean is greater for Family A.
C. The variability for Family B is greater because the mean absolute deviation is greater for Family B.
D. There is not enough information to determine the variability.

Q.5) Find the mean absolute deviation for the set below. S = {65, 90, 85, 70, 70, 95, 55}

A. 12.24
B. 75.7
C. 85.7
D. 40

Name: _____ Date: _____ BW2

Mr. Williams Period: _____

Interpreting Box-and-Whisker Plots

1) Below are the prices of snowboards at two competing snowboard stores:

Middletown Snowboards
345, 350, 356, 360, 375, 405

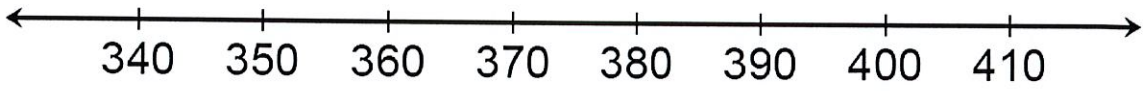
Snowboard Central
343, 370, 386, 392, 395, 402

a) Identify the 5 main statistics of each set of data.

Middletown Snowboards

Snowboard Central

b) Draw a double box-and-whisker plot of the above data on the scale below:



c) What is the median price for a snowboard at Middletown Snowboards?

What is the lowest price you could pay for a snowboard at Snowboard Central?

What is the most expensive board at Middletown Snowboards?

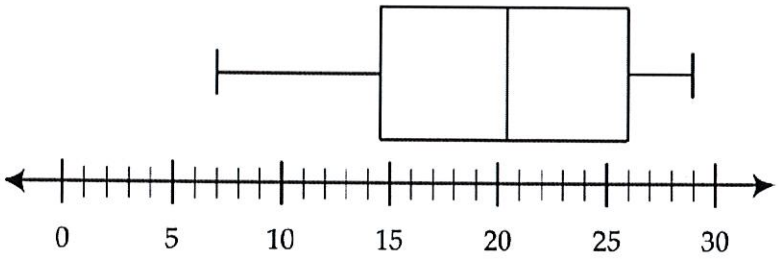
What is the range of prices for snowboards at Snowboard Central?

Which price represents the 75th percentile for Middletown Snowboards?

Which store would you rather buy a snowboard from? Why?

7

2) The accompanying box-and-whisker plot represents the cost, in dollars, of twelve CD's.



a) Which cost is the upper quartile?

b) What is the range of the costs of the CD's?

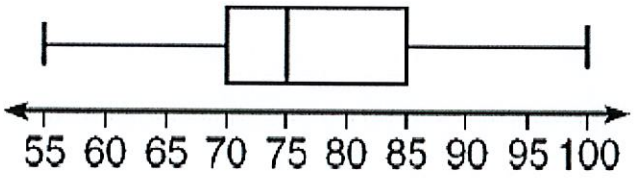
c) What is the median?

d) Which cost represents the 100th percentile?

e) How many CD's cost between $14.50 and $26.00?

f) How many CD's cost less than $14.50?

3) The accompanying box-and-whisker plot represents the scores earned on a math test.



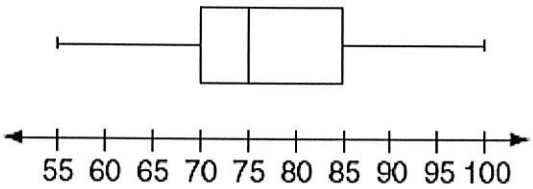
a) What is the median score?
(1) 75 (2) 70 (3) 85 (4) 77

b) What score represents the first quartile?
(1) 55 (2) 70 (3) 100 (4) 75

c) What statement is *not* true about the box and whisker plot shown?
(1) 75 represents the mean score
(2) 100 represents the maximum score
(3) 85 represents the 3rd quartile
(4) 55 represents the minimum score

d) A score of an 85 on the box-and-whisker plot shown refers to:
(1) the third quartile
(2) the median
(3) the maximum score
(4) the mean

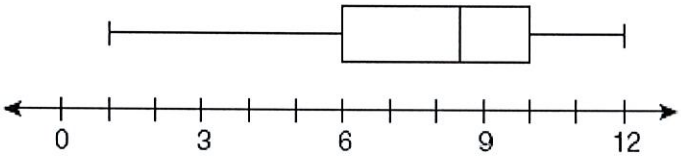
4) What is the median price for a snowboard at Middletown Snowboards?



What is the median score?

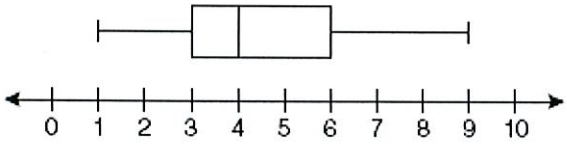
(1) 70
(2) 75
(3) 77
(4) 85

5) What is the value of the third quartile shown on the box-and-whisker plot below?



(1) 6
(2) 8.5
(3) 10
(4) 12

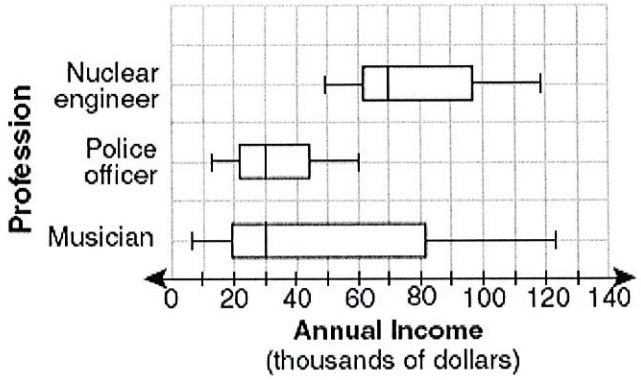
6) A movie theater recorded the number of tickets sold daily for a popular movie during the month of June. The box-and-whisker plot shown below represents the data for the number of tickets sold, in hundreds.



Which conclusion can be made using this plot?

(1) The second quartile is 600.
(2) The mean of the attendance is 400.
(3) The range of the attendance is 300 to 600.
(4) Twenty-five percent of the attendance is between 300 and 400.

7) The accompanying box-and-whisker plots can be used to compare the annual incomes of three professions.

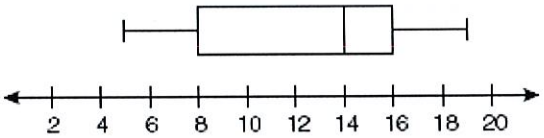


Based on the box-and-whisker plots, which statement is true?
(1) The median income for nuclear engineers is greater than the income of all musicians.
(2) The median income for police officers and musicians is the same.
(3) All nuclear engineers earn more than all police officers.
(4) A musician will eventually earn more than a police officer.

8) The data set 5, 6, 7, 8, 9, 9, 9, 10, 12, 14, 17, 17, 18, 19, 19 represents the number of hours spent on the Internet in a week by students in a mathematics class. Which box-and-whisker plot represents the data?

(1)


(2)


(3)


(4)


Finding Interquartile Range

INTERQUARTILE RANGE = IQR
INTERQUARTILE RANGE = Q3 minus Q1

Directions: Solve the following problems by finding the median, interquartile range (IQR), or range. You may use a calculator, but you must **show your work!**

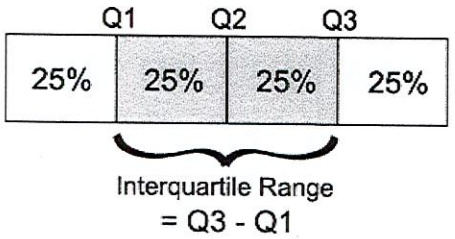
1. {13, 15, 9, 35, 25}

Median = _____

Q1 = _____

Q3 = _____

IQR = _____



2. {6, 1, 3, 8, 5, 11, 1, 5}

Median = _____

Q1 = _____

Q3 = _____

IQR = _____

3. Jason and Jill are two students in Mr. White's math class. On the last five quizzes, Jason scored an 80, 90, 95, 85, and 70. Jill scored a 70, 75, 90, 100, and 95. Find the median and IQR for each student.

Jason's Median = _____ Jill's Median = _____

Jason's IQR = _____ Jill's IQR = _____

Whose quiz grades are more consistent? _____

4. The Smith and Jones families each have six family members. They wanted to compare the differences in ages between the two families. The ages of the members of Smith family are 45, 43, 13, 11, 5, and 2, while the Jones family members are 45, 39, 17, 16, 4, and 1. Find the range and IQR for the ages in each family.

Smith Family Range = _____ Jones Family Range = _____

Smith Family IQR = _____ Jones Family IQR = _____

5. Sherry has an after-school job at Papa John's. Her boss keeps track of how many pizzas she sells each day. During her last five days of work, she served 29, 58, 15, 75, and 22 pizzas.

What was the median number of pizzas Sherry sold? _____

What was the range of the pizzas she sold? _____

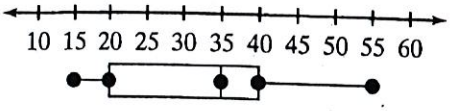
What was the IQR of the pizzas she sold? _____

Name _____ Class _____ Date _____

Practice 12-2 Box-and-Whisker Plots

Use the box-and-whisker plot to answer each question.

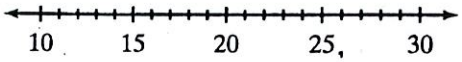
Weekly Mileage Totals, 24 Runners



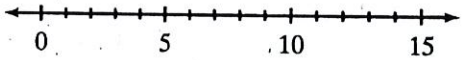
1. What is the highest weekly total? _____ the lowest? _____
2. What is the median weekly total? _____
3. What percent of runners run less than 40 miles a week? _____
4. How many runners run less than 20 miles a week? _____

Make a box-and-whisker plot for each set of data.

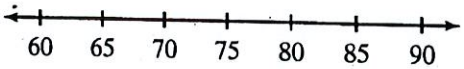
5. 16 20 30 15 23 11 15 21 30 29 13 16



6. 9 12 10 3 2 3 9 11 5 1 10 4 7 12 3 10

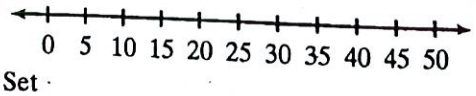


7. 70 77 67 65 79 82 70 68 75 73 69 66 70 73 89 72

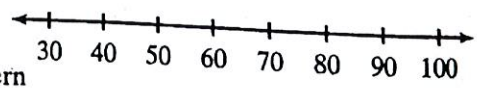


Use box-and-whisker plots to compare data sets. Use a single number line for each comparison.

8. 1st set: 7 12 25 3 1 29 30 7 15 2 5 10 29 1 10 30 18 8 7 29
   2nd set: 37 17 14 43 27 19 32 1 8 48 26 16 28 6 25 18



9. Area in 1,000 mi^2
   Midwestern states:
   45 36 58 97 56 65 87 82 77
   Southern states:
   52 59 48 52 42 32 54 43 70 53 66



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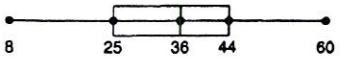
12

Why Didn't the Physics Teacher Marry the Biology Teacher?

Find each correct answer at the bottom of the page and write the letter for that answer under it.

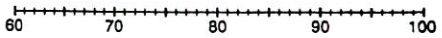
1 **For the box-and-whisker plot at the right, give the following:**

O. the first quartile
E. the second quartile (median)
T. the third quartile
H. the range



2 **Arrange these scores in order from smallest to largest. Draw a box-and-whisker plot of the data under the number line at the right. Give the following:**

TEST SCORES						
82	86	89	84	78	82	92
95	77	69	98	95	63	73

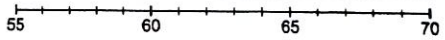


A. the median
I. the first quartile
E. the third quartile
C. the range
R. percent of the scores between the first and third quartiles

3 **Arrange each set of heights in order from smallest to largest. Draw two box-and-whisker plots, one for boys and one for girls, under the number line at the right.**

Heights of boys (in.): 64, 61, 66, 64, 58, 63, 68, 64, 60, 57, 65, 63, 69, 64, 64, 68, 61, 65
Heights of girls (in.): 63, 60, 67, 62, 58, 63, 68, 59, 62, 65, 56, 63, 59, 62, 58

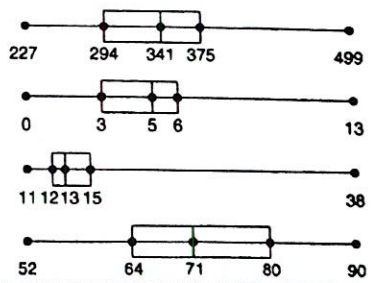
Give the following:



T. the median for boys
E. the first quartile for boys
S. the third quartile for boys
Y. the median for girls
R. the first quartile for girls
H. the third quartile for girls

4 **Match each description with the most reasonable box-and-whisper plot. Look for the median of this plot in the answer spaces. Write the exercise letter in that box.**

N. Season scores of a baseball team
S. Resting heart rates (beats per minute)
W. Prices of 25-inch TV sets ($)
M. Ages at a Boy Scout meeting



64	52	92	59	36	89	341	83	65	38	5	25	60	35	63	61	13	77	71	44	50	62

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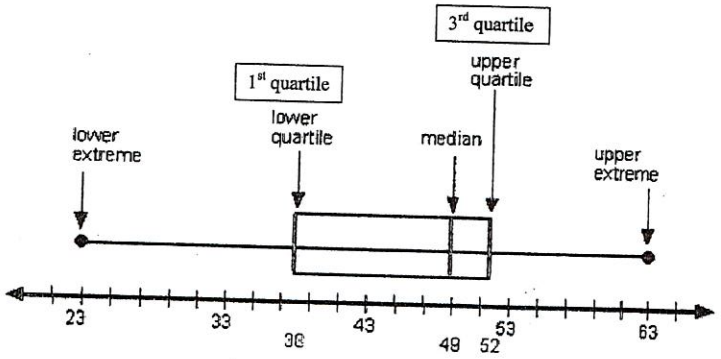
Box and Whiskers Plot (Box Plot)



Each section contains one fourth of the data.

Inter-quartile range (IQR) = upper quartile minus lower quartile

Example: Create a box and whisker plot using this data: 7, 19, 6, 12, 5, 17, 6, 13

1. → 5 6 6 **7 12** 13 17 19

2. → Median = 7+12= 19 /2 = **9.5**

3. → 5 6 6 7 **9.5** 12 13 17 19

Lower quartile= Upper quartile=

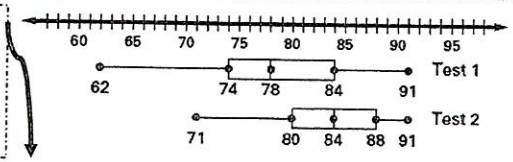
4. → Lower extreme = _____ Upper extreme = _____

Create a box and whisker plot using this data: 14, 6, 13, 17, 1, 12, 9, 18. Show all 4 steps and work neatly below.

Create a box and whisker plot using this data: 77, 99, 112, 85, 117, 68, 63. Show all 4 steps and work neatly below.

The box-and-whisker plots below show a class' test scores for two tests. What conclusions can you make?

THESE ARE ALL THE DIFFERENT THINGS YOU CAN WRITE ABOUT WHEN IT ASKS YOU TO COMPARE THIS TYPE OF DATA DISPLAY.



- The _____ are the same for both tests.
- The median for the second test is _____ than the median for the first test.
- The _____ for the first test is the same as the _____ for the second test.
- The scores for the _____ are more spread out than the scores for the _____.
- Both **range** (91 – 62 = ____) and the **interquartile range** (84 – 74 = ____) of the first test are _____ than the **range** (91 – 71 = ____) and the **interquartile range** (88 – 80 = ____) of the second test.

Inner quartile range is _____

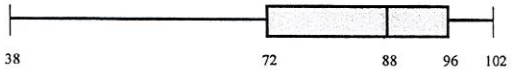
I

Name _____ Period _____

Box & Whisker Worksheet

For questions 1 – 6, refer to the box & whisker graph below which shows the test results of a math class.

Test Scores (as %) for 6th Period



_____ 1. What was the high score on the test?

_____ 2. What percent of the class scored above a 72?

_____ 3. What was the median score on the test?

_____ 4. What percent of the class scored between 88 & 96?

5. Do you think that this test was too hard for the students? Explain.

_____

_____

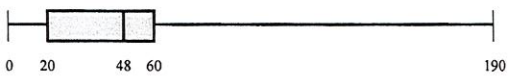
6. Would you expect the mean to be above or below the median? Explain.

_____

_____

For questions 7 – 11 refer to the box & whisker graph below that shows how much time was spent per night on homework for sophomore class at a certain high school during September.

Average Minutes Per Night Spent On Homework



_____ 7. What percent of the sophomores spend more than 60 minutes on homework per night?

_____ 8. What is the range of times that the middle 50% of the sophomores spend on homework per night?

_____ 9. How many sophomores do not do homework?

_____ 10. What percent of the sophomores spend less than 20 minutes per night on homework?

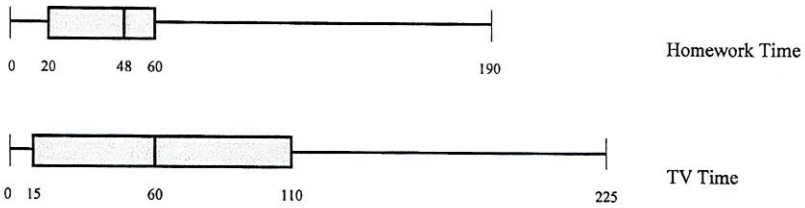
11. Would you expect the mean number of minutes per night to be higher or lower than the median? Explain.

_____

_____

For questions 12 – 23, refer to the box & whisker graphs below that compare homework time per night with TV time per night for the same group of sophomores.

TV & Homework Minutes per Night



_____ 12. What percent of the sophomores watch TV for at least 15 minutes per night?

_____ 13. What is the 3rd quartile for the TV time data?

14. Is it more common for a sophomore at this high school to spend more than 1 hour on homework or more than 1 hour watching TV? Explain.

_____

_____

_____

For questions 15 – 23, identify if each statement is true, false, or cannot be determined.

_____ 15. Some sophomores didn't watch TV that month.

_____ 16. The TV box & whisker graph contains more data than the homework graph.

_____ 17. 25% of the sophomores spend between 48 & 60 minutes per night on homework.

5

_____ 18. 15% of the sophomores didn't watch TV that month.

_____ 19. In general, these sophomores spend more time watching TV than doing homework.

_____ 20. The TV data is more varied than the homework data.

_____ 21. The ratio of sophomores who spend more than 110 minutes per night watching TV to those who spend less is about 2:1.

_____ 22. 225 sophomores watch TV.

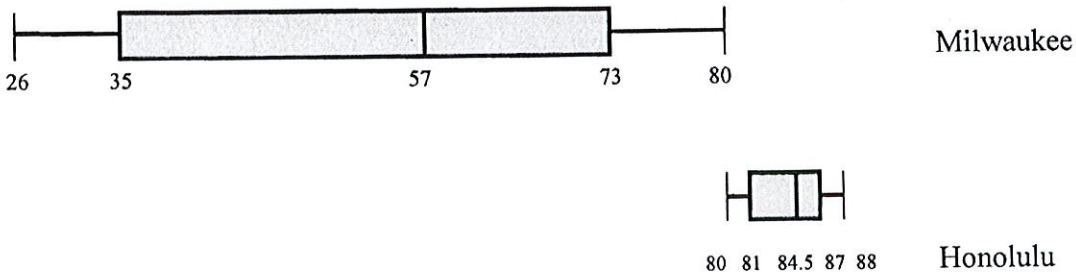
_____ 23. Twice as many sophomores watch TV for more than 1 hour than do homework for more than 1 hour.

24. Suppose that one family kept track of how many DVDs they rented each month for a two year period. The numbers for each month are shown in the table below. Make a box & whisker graph from this data.

J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
3	5	2	8	1	5	0	3	6	4	9	15	3	6	4	1	10	3	8	7	2	9	0	11

For question 25, refer to the box & whisker graphs below that show the average monthly high temperatures for Milwaukee, Wisconsin & Honolulu, Hawaii.

Average Monthly High Temperatures



25. Write a short paragraph comparing the temperatures in both cities.

_____

_____

_____

_____

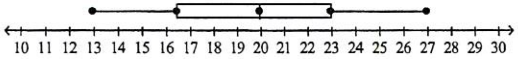
_____

Name: _____ Hour: _____

Box & Whisker Plot Worksheet 1

1. The box and whisker plot below shows the volunteer service hours performed by students at Indian Trail Middle School last summer.

Volunteer Service Hours



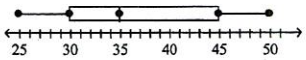
a. What is the median of the data set?

b. What is the **lower quartile** of the data set?

c. What is the **upper quartile** of the data set?

d. What percentage of data is between the lower quartile and the upper quartile?

2. What is the median of the following box and whisker plot? What percentage of the data is below the median?

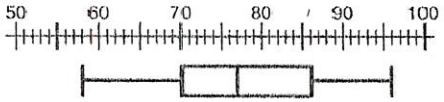


3. The five values that make up a box and whisker plot are:

4. The five values in question 3 are called the _____.

Name: _____ Hour: _____

5. What is the five number summary of the following box and whisker plot?



6. Create a box and whisker plot with the following set of data: 3, 2, 3, 4, 6, 6, 7

7. Create a box and whisker plot with the following set of data: 1, 2, 5, 6, 9, 12, 7, 10

8. Find the mean, median, mode, and range of the following set of data:

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

Student Name: _____ Score:

Box – Whisker Plot - Medium

Problem 1:

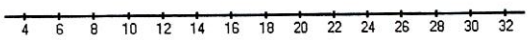
Draw box and whisker for the given data:

23, 10, 13, 30, 26, 8, 25, 18

Work Space:

First Quartile = Second Quartile or Median =

Third Quartile = Range =



Problem 2:

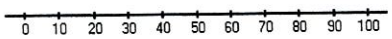
Draw box and whisker for the given data:

35, 60, 20, 80, 95, 15, 40, 85, 75

Work Space:

First Quartile = Second Quartile or Median =

Third Quartile = Range =



17

Student Name: _____ Score:

Quartiles Worksheet

Find the first, second (median) and third quartiles. Work Space

1) 4, 6, 5, 6, 2, 7, 6, 8
   First quartile = _____
   Second quartile = _____
   Third quartile = _____

2) 17, 14, 20, 29, 12, 24, 10, 19
   First quartile = _____
   Second quartile = _____
   Third quartile = _____

3) 68, 88, 44, 68, 50, 68, 37, 50
   First quartile = _____
   Second quartile = _____
   Third quartile = _____

4) 52, 60, 24, 36, 48, 52, 72
   First quartile = _____
   Second quartile = _____
   Third quartile = _____

5) 102, 78, 312, 170, 250, 40, 52, 38, 125
   First quartile = _____
   Second quartile = _____
   Third quartile = _____

18

8

Name _____ Period _____

Histograms and Dot Plots Worksheet

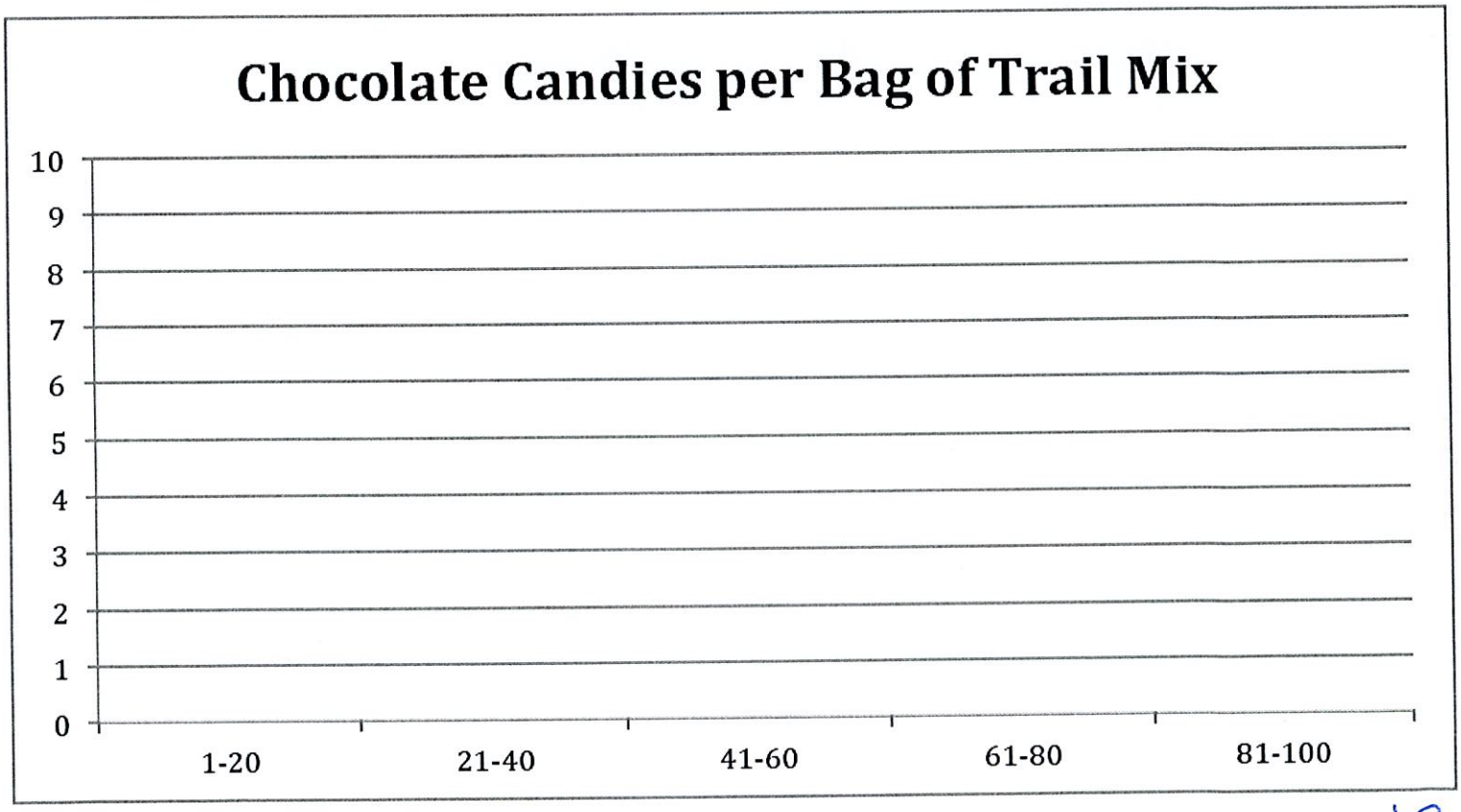
Directions: Create a histogram for each set of data. For the first problem, the graph is set up for you. For the second problem, you will need to determine the best way to number the axes. Do not forget to include a title as well.

1. Chocolate candies per bag of trail mix:

50	**42**	**100**	**45**	**68**	**32**	**100**
67	**61**	**31**	**75**	**39**	**62**	**64**
49	**55**	**51**	**33**	**99**	**96**	**64**

Frequency table:

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

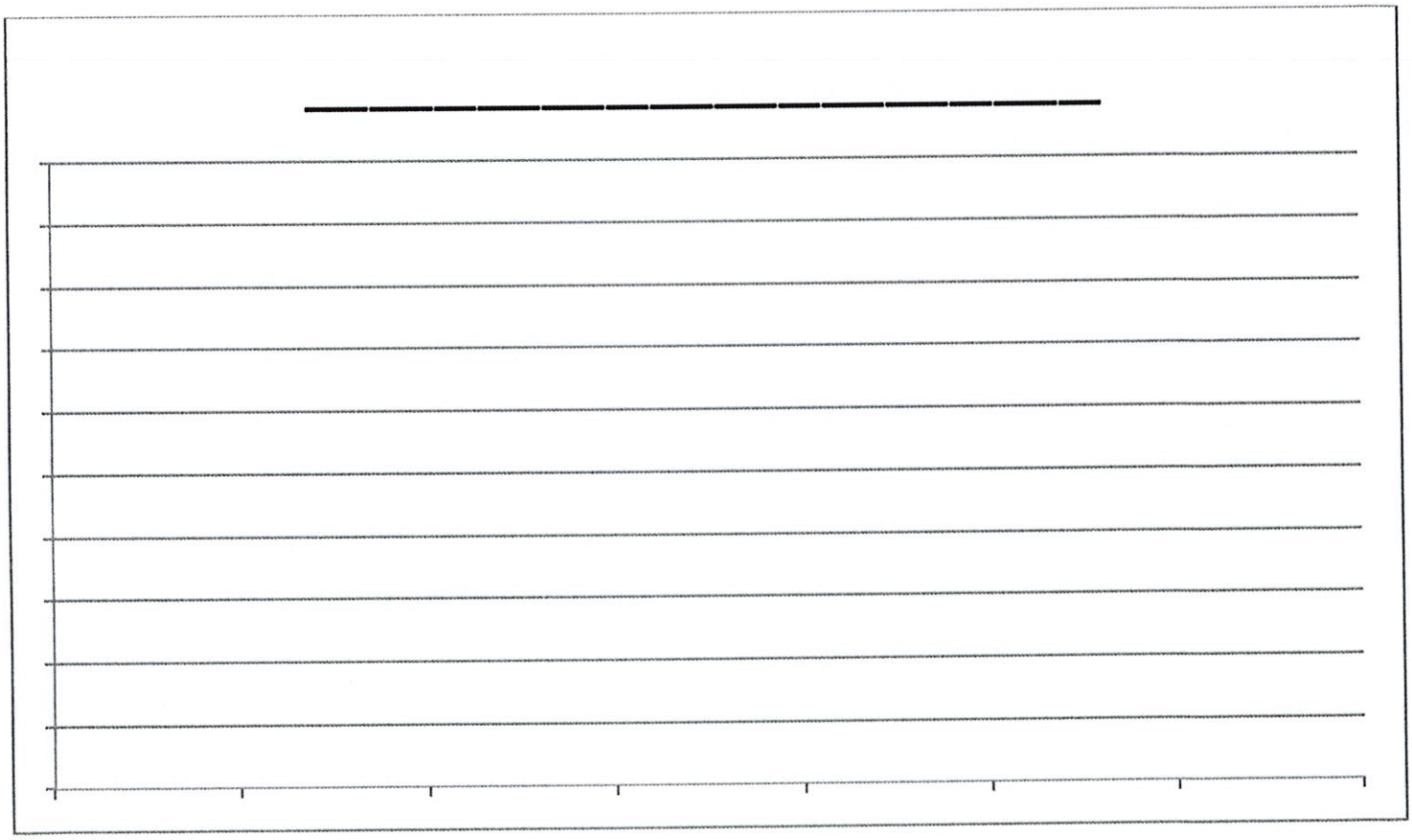


2. Test scores, out of 100 points

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



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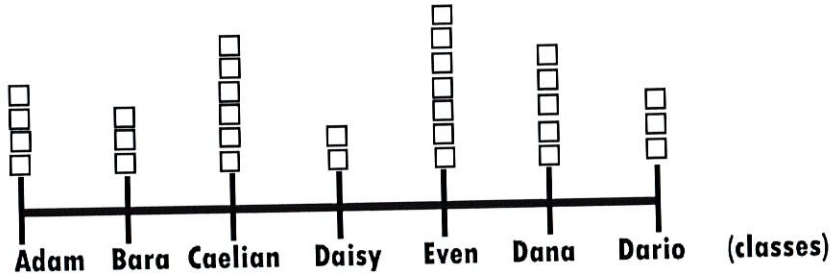
Directions: Answer the following questions based on each of the dot plots.

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

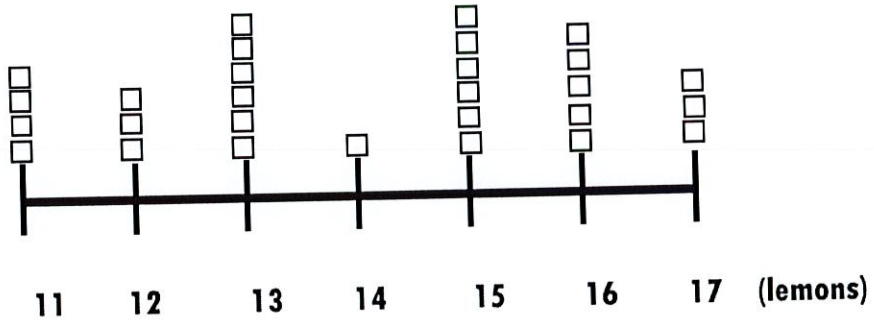


a. How many total students are there in all classes?

b. Which class has the least number of students?

c. Which class has the most number of students?

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



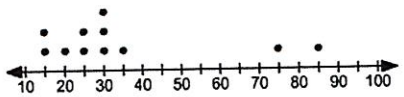
a. How many total individuals are represented in the dot plot?

b. 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

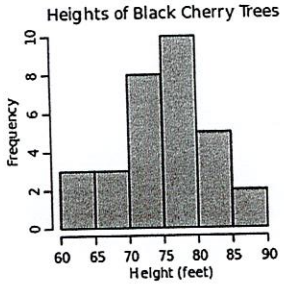
Analyzing Dot Plots and Histograms.



Dot Plot

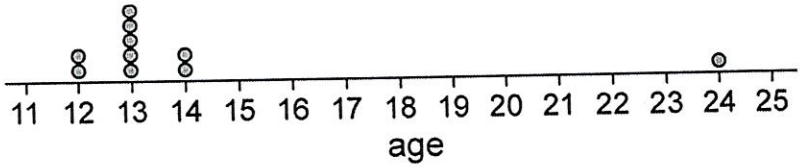
Find the mean, median, mode and range of the dot plot above.

What measure of central tendency would be the best to use for this plot?



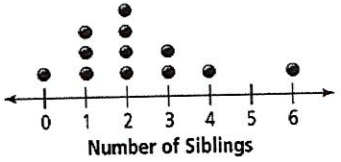
What percentage of trees are less than 70 feet tall?

What percentage of trees are at least 75 feet tall?



Create a box plot using the dot plot above.

What measure of central tendency would be best to use for the dot plot above?



Find the mean, median, mode and range of this dot plot about the number of siblings.

What measure of central tendency would be best to use here?