

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

Spring 2016

P. Walston/A. Moore

# AFM UNIT 2: Statistics

Topic	worksheet	# assigned	#completed	Teacher's Signature
Central Tendency/ Box Plots	2-1	21		
Dots Plots	2-2	11		
Standard Deviation	2-3	9		
Introductions to Normal Distribution	2-4.0	11		
Normal Distribution/ Percentile Rank	2-4	25		
Z-Scores	2-5	18		
Histograms	2-6	10		
Samples and Surveys	2-7	15		
		TOTAL Assigned  120	TOTAL Completed	HOMEWORK GRADE (#done/#com x 100=)

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1) Determine the mean, median, and mode for each data set (round to one decimal place).

a) {2, 3, 5, 5, 7, 7, 7, 8, 9, 10}

b) {8, 7, 5, 6, 3, 2, 9, 8}

c) {210, 180, 188, 162, 170}

d) {4.5, 20.7, 35.2, 28.8, 36.5, 40.5}

e) {5.3, 8.4, 5.3, 9.2, 10.6, 9.2}

f) {2150, 1860, 2340, 1990}

2) Invent a data set that matches each description.

a) Five values, mean=15, median=13, no mode.

b) Six values, mean=24, median=25, mode=28

3) Suppose you have a data set containing 1000 test scores. How many scores would you expect to find matching each description?

a) Above the median

b) Below the first quartile

c) Between the first and third quartiles

d) Above the third quartile

e) Below the third quartile

f) Above the first quartile

g) Between the median and the third quartile

4) Give the five-number summary for each data set. And draw a box-and-whisker plot for each.

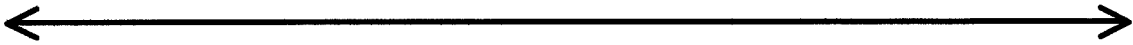
a) {10, 8, 6, 4, 2}



b) {0, 30, 45, 50, 75, 80, 95}



c) {8, 6, 8, 2, 9, 4, 4, 3, 1}



d) {32, 55, 16, 70, 65, 55, 40, 49}



e) {19.3, 32.4, 20.5, 18.0, 26.6, 21.4, 16.7, 33.9}



f) {0.52, 3.91, 4.67, 2.20, 8.15, 5.91, 7.94, 1.11, 6.55, 4.03}

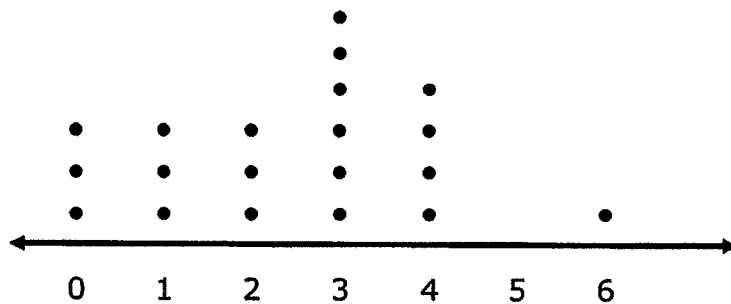


AFM Unit 2 Statistics  
Worksheet 2-2

Name \_\_\_\_\_

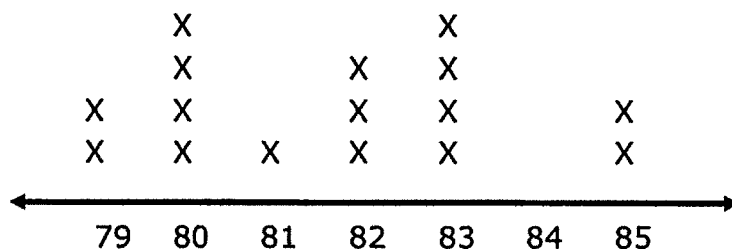
Dot Plot Worksheet

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.



- How many of the students have six siblings?
- How many of the students have no siblings?
- 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.



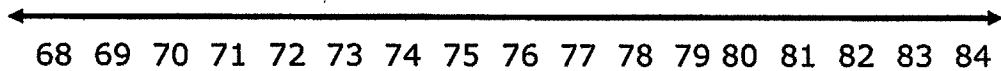
- What is the range of the pulse rates?
- How many boys had a pulse rate over 81?
- How many boys had a pulse rate of 83?

- 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?

## Unit 2 Worksheet 3

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

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1) For each data set, find the mean, the deviation from the mean **for each value**, and the standard deviation of the data set. (Round to one decimal place.)

a) {12.4, 26.3, 9.8, 33.9, 7.6}

b) {235, 413, 505, 111, 700, 626, 357}

c) {0.5, 2.6, 1.8, 4.7, 0.9}

2) For each data set, calculate the mean and standard deviation. Include appropriate units in your answers.

a) The heights, in inches, of eight children are 32, 45, 39, 51, 28, 54, 37, and 42.

b) The lengths, in centimeters, of six pencils are 8.5, 19.0, 11.8, 13.2, 16.4, and 6.1.

c) The prices of seven music CDs are \$13.50, \$10.95, \$9.95, \$16.00, \$12.50, \$15.95, and \$17.75.

3) For each data set, find the median, the range, and the IQR.

a) {18, 13, 15, 24, 20}

b) {4, 9, 7, 6, 0, 11, 7}

c) {356, 211, 867, 779, 101, 543}

2-4.0

# Practice

## The Normal Distribution

Determine whether the data in each table appear to be *positively skewed*, *negatively skewed*, or *normally distributed*.

1. **Time Spent at a Museum Exhibit**

Minutes	Frequency
0–25	27
26–50	46
51–75	89
75–100	57
100+	24

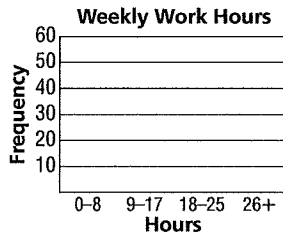
2. **Average Age of High School Principals**

Age in Years	Number
31–35	3
36–40	8
41–45	15
46–50	32
51–55	40
56–60	38
60+	4

For Exercises 3 and 4, use the frequency table that shows the number of hours worked per week by 100 high school seniors.

Hours	Number of Students
0–8	30
9–17	45
18–25	20
26+	5

- Make a histogram of the data.
- Do the data appear to be *positively skewed*, *negatively skewed*, or *normally distributed*? Explain.



**TESTING** For Exercises 5–10, use the following information.

The scores on a test administered to prospective employees are normally distributed with a mean of 100 and a standard deviation of 15.

- About what percent of the scores are between 70 and 130?
- About what percent of the scores are between 85 and 130?
- About what percent of the scores are over 115?
- About what percent of the scores are lower than 85 or higher than 115?
- If 80 people take the test, how many would you expect to score higher than 130?
- If 75 people take the test, how many would you expect to score lower than 85?
- TEMPERATURE** The daily July surface temperature of a lake at a resort has a mean of  $82^\circ$  and a standard deviation of  $4.2^\circ$ . If you prefer to swim when the temperature is at least  $77.8^\circ$ , about what percent of the days does the temperature meet your preference?

1. The lifetimes of 10,000 watch batteries are normally distributed. The mean lifetime is 500 days. The standard deviation is 60 days. Sketch a normal curve that represents this distribution; label the mean and standard deviation.

Estimate how many watch batteries will last for each of the following intervals.

- a.) 440 - 560 days
  
- b.) 380 - 620 days
  
- c.) 320 - 680 days
  
- d.) 410-590 days? (In addition to your answer, also write down what you have to enter into your calculator.)

2. A group of students weighs 500 US pennies. They find that the pennies have normally distributed weights with a mean of 3.1g and a standard deviation of 0.14g

- a) What percentage of pennies will weigh between 2.8 and 3.3g?
  
- b) What percentage of pennies will weigh between 2.11 and 3.5g?
  
- c.) What percentage of pennies will weigh less than 2.96g?
  
- d.) What percentage of pennies will weigh more than 3.4g?



3. A set of 1000 values has a normal distribution. The mean of the data is 120, and the standard deviation is 20.

a. What percent of the data is in the range 110 to 130?

b. What percent of the data is in the range 90 to 110?

c. How many values are within the limits 100 and 150?

d. How many values are greater than 140?

e. How many values are within one standard deviation from the mean?

f. Find the symmetric interval about the mean which includes 90% of the data.

g. Find the symmetric interval about the mean which includes 77% of the data.

h. Find the point below which 90% of the data lie.

4. The heights of a large group of men are normally distributed with a mean of 70in. and a standard deviation of 2.5 in. Find an interval about the mean that contains 75% of the heights.

Find the values at the 20th and 80th percentiles for each set of values.

Find the following percentiles of the data set displayed below.

27, 28, 29, 29, 30, 31, 32, 33, 34, 35, 36, 36, 37, 38, 39, 40, 40, 41, 42, 43
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5. 45th percentile

6. 70th percentile

7. 25th percentile

8. 95th percentile

9. 80th percentile

10. 15th percentile

11. **Error Analysis** Your friend calculated the tenth percentile of the data set shown above and got 35. What error did your friend make? What is the correct answer?

**The weights of 1000 children were recorded on their first birthdays. The weights are normally distributed with mean 10.3 kg and standard deviation 1.6 kg.**

*(Round answers to one decimal place.)*

1. What percent of the children weigh between 8.7 kg and 11.9 kg?
2. What percent of the children weigh between 9.5 kg and 11.5 kg?
3. What percent of the children weigh between 9.2 kg and 11.3 kg?
4. What percent of the children weigh between 8.3 kg and 12.3 kg?
5. What percent of the children weigh less than 10 kg?
6. What percent of the children weigh more than 13 kg?
7. How many children weigh less than 7.9 kg?
8. How many children weigh more than 8.7 kg?

9. The heights of a group of 500 women are normally distributed with mean 65 inches and standard deviation 2.2 inches. Find the height for each of these z-scores. *Round your answers to one decimal place.*

a)  $z = 2$

b)  $z = 0.5$

c)  $z = -1.5$

d)  $z = 1.7$

e)  $z = -2.3$

f)  $z = -3.4$

10. For a normal distribution, give the percentage of all data values that fall within each interval.

a) Within three standard deviations of the mean

b) Between the mean and one standard deviation above the mean

c) Between the mean and two standard deviations below the mean

11. The mean commuting time for a resident of a certain metropolitan area is 38 minutes, with a standard deviation of 10 minutes. Assume that commuting times for this area are normally distributed.

a) Find the z-score for a 23-minute commute

b) Find the z-score for a 60-minute commute

c) What is the probability that a commute for a randomly chosen resident will be between 28 minutes and 58 minutes?

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.

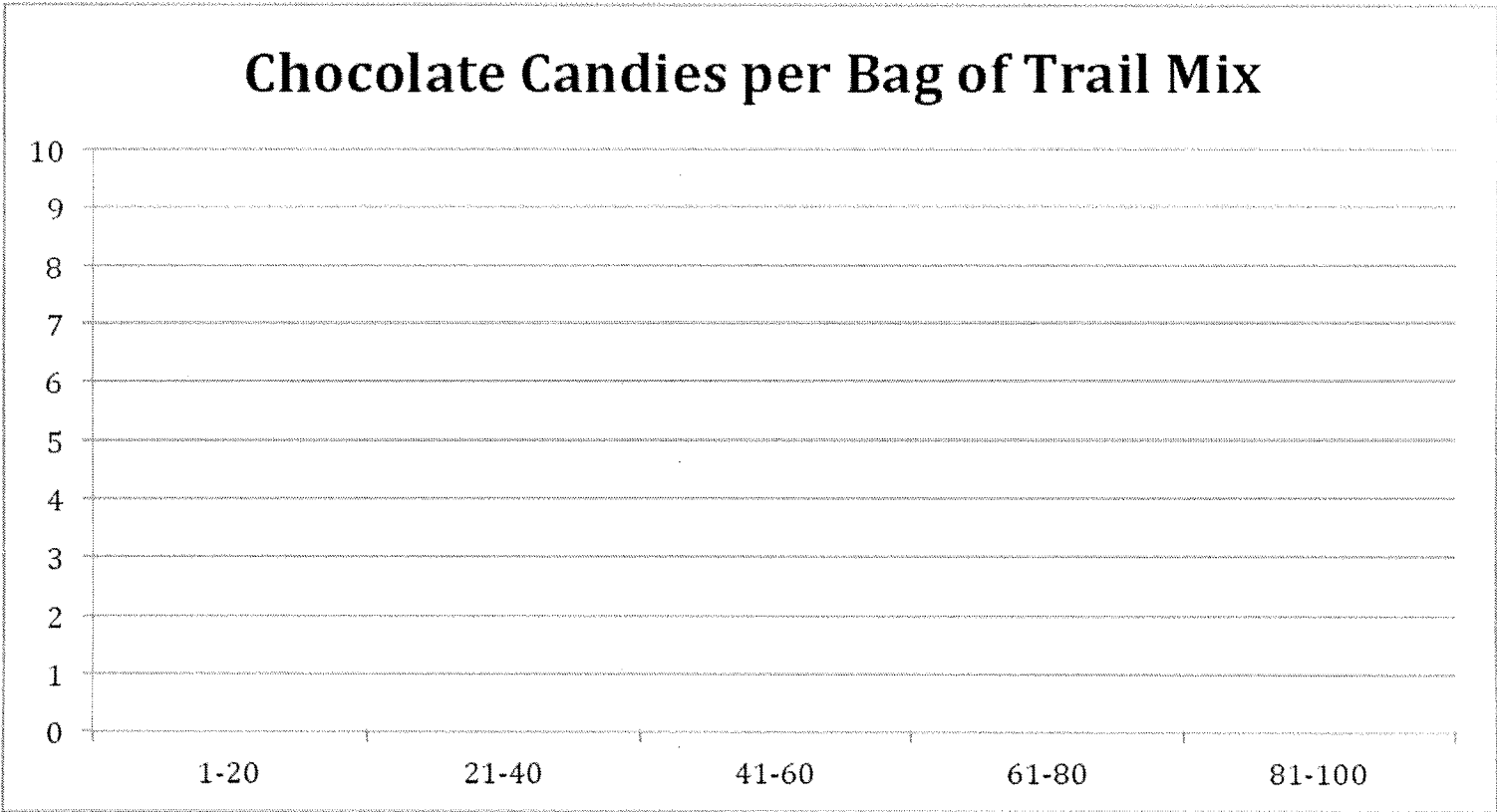
1. Chocolate candies per bag of trail mix:

<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	

### Chocolate Candies per Bag of Trail Mix



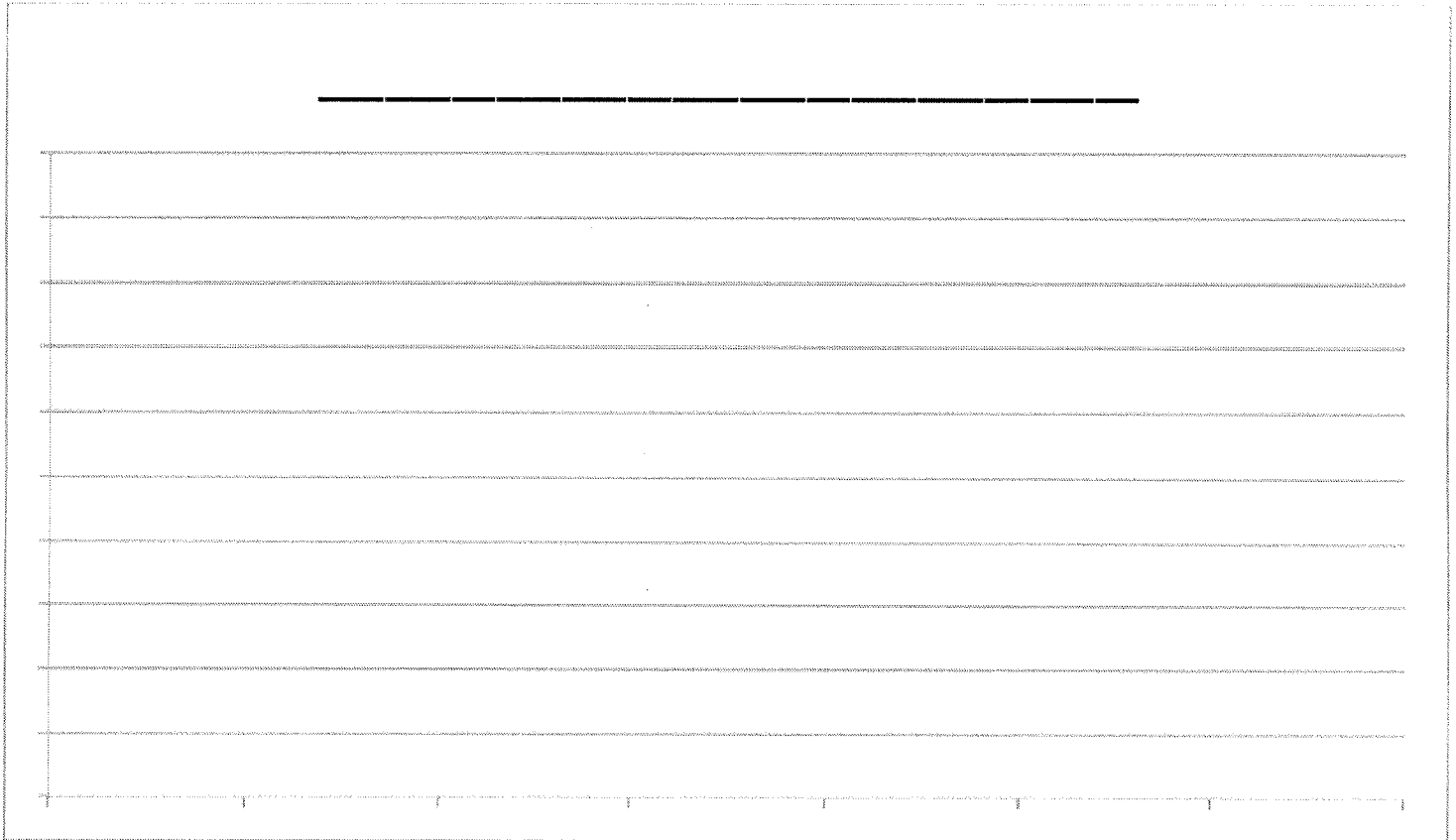
2-5

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:

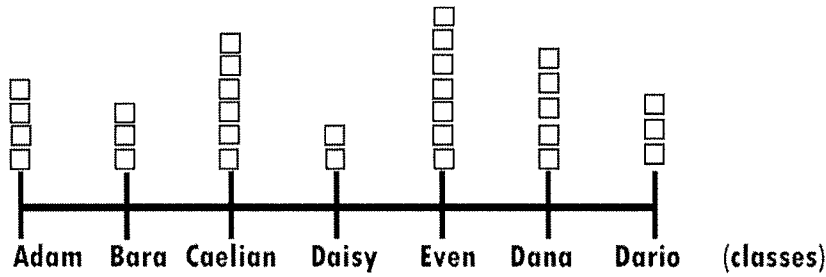
Interval	# of values



2-6

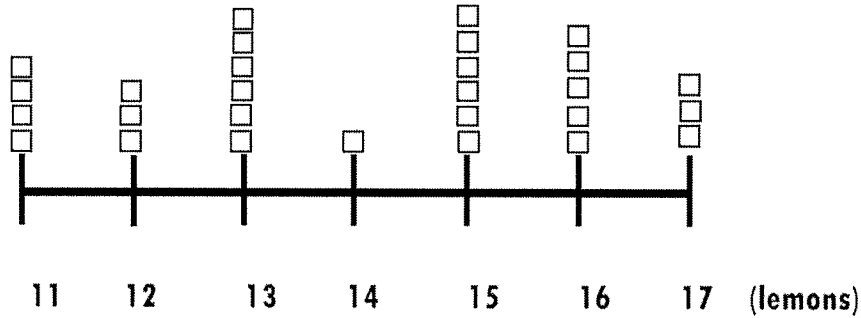
**Directions:** Answer the following questions based on each of the dot plots.

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



2-7

**Practice**

Form K

**Samples and Surveys**

Identify the sampling methods used in each of the following situations. Then state whether the sampling method has any bias.

1. A television station invites viewers to call in and name their favorite game show.
2. A school principal gathers an alphabetical list of all the students at her school. Then she selects every 15th student to take a survey about the cafeteria's lunch menu.
3. A reporter asks people leaving a movie theater to take a survey about their television viewing habits.
4. A psychologist uses a computer program to randomly select names from a list of students at a university. The members of the sample will take a survey about student housing at the university.
5. **Writing** A group of television producers plans to survey 10-year-olds to determine their opinions about a new cartoon. Describe a sampling method that could be used to gather a biased sample in this situation. Then describe a method to gather an unbiased sample.
6. **Multiple Choice** A school psychologist sits in a school cafeteria and takes notes on students' behavior while they eat lunch. Which of the following types of studies is the researcher conducting?  
 A controlled experiment       B observational study       C survey
7. **Open-Ended** Your classmate is randomly selecting a sample of students at his high school to take a survey. You say that your classmate's sample is biased because it only contains high-school students. In what case might you be wrong?



