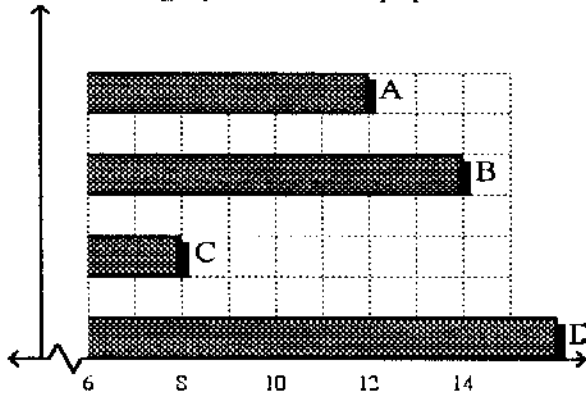


**Agriculture**  
**Statistics in Ag Worksheet**

Name \_\_\_\_\_

*Key*

1. The graph shows the population of four towns.



- a. Which town *appears* to have about twice the population of Town C? *Town A*  
 b. Which town *actually* has twice the population of Town C? *Town D*  
 c. Explain why the graph is misleading.

*The break in the horizontal axis exaggerates the differences in populations.*

2. test scores on a math exam:

*B*

88, 89, 65, 62, 83, 63, 84, 63, 74, 64, 71, 82, 66, 88, 79, 60, 86, 63, 93, 99, 60, 85

- a. mean = 75.8, median = 79.5, mode = 63  
 b. mean = 75.8, median = 76.5, mode = 63  
 c. mean = 69.5, median = 76.5, mode = 63  
 d. mean = 69.5, median = 76.5, mode = 79.5

3. A greenhouse recorded the heights (in cm) of several rose bushes shown in the table below. The nursery wants to advertise the average height of the rosebushes in a catalogue. Find the mean, median, and mode. Explain which measure of center is the best indicator of the average.

54	75	65	46	74
73	40	53	63	70

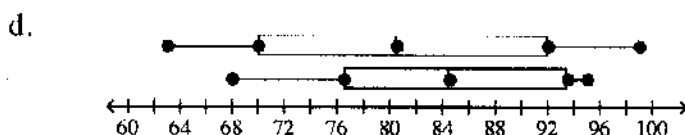
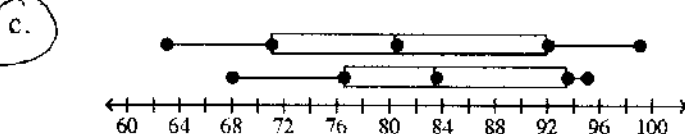
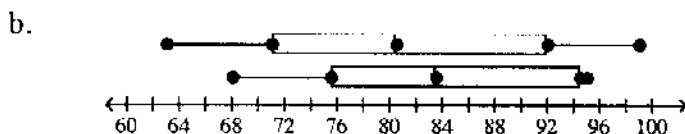
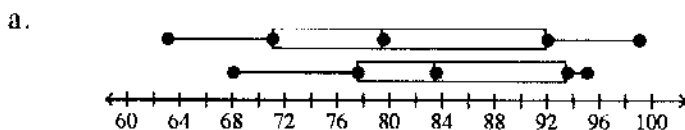
*Mean = 61.3*  
*Median = 64*  
*Mode = None*

*The mean is the best indicator of the average since there is no mode & there are no outliers affecting the mean.*

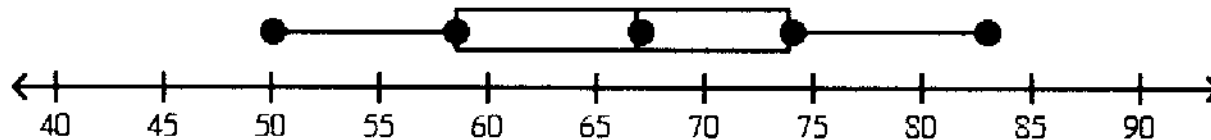
4. Compare the data sets by making two box-and-whisker plots above one number line.

Grades of Class A: 71, 78, 95, 68, 91, 95, 85, 76, 94, 77, 79, 95, 82, 93, 92, 70

Grades of Class B: 86, 98, 99, 64, 80, 89, 63, 95, 70, 69, 81, 77, 72, 87, 96, 79



5. Describe the data in the box-and-whisker plot.



- a. The lowest value is 58.5 and the highest value is 74. The median is 67. At least half of the data are within 8.5 points of the median.
- b. The values range from 50 to 83. At least half of the data are within 7 points of the median, 67.
- c. The lowest value is 50 and the highest value is 83. The median is 67. At most half of the data are within 7 points of the median.
- d. The values range from 50 to 83. At least half of the data are within 8.5 points of the median, 67.

6. Identify the outlier in the set of values. Then describe how the outlier affects the mean of the data.  
10, 32, 3, 12, 20, 30, 36, 32, 74, 26, 16, 7, 20, 33

The outlier is 74. It raises the mean.

7. The table below lists the U.S. soybean yields in bushels per acre from 2001 - 2016.

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bushels	39.6	38.0	33.9	42.2	43.1	42.9	41.7	39.7	44.0	43.5	42.0	40.0	44.0	47.5	48.0	48.9

Source: USDA

Use the table to find the following information:

- mean
- median
- mode
- Range
- IQR
- standard deviation
- Explain which measure of central tendency you think best predicts the average U.S. wheat production.
- Describe the spread of the data. Is the data consistent? Are there outliers?

Mean = 42.4      Median = 42.6      Mode = 44.0

Range = 15      IQR = 4.15      Standard deviation = 3.7

The mean & median are both close. Since there are no outliers, the mean is the best predictor of the average. The data has a 15 bushel per acre range & a smaller spread of 4.15 bushel per acre from  $Q_1$  to  $Q_3$ . 68% of the data falls within 1 standard deviation from the mean (38.7 to 46.1) & the remainder of the values fall within 2 & 3 standard deviations which is normal. No outliers.

8. Students from two high schools went to a band competition. Each student gave a solo performance and was rated by the judges. The possible scores ranged from 3 (one point from each judge) to 21 (seven points from each judge). The data show the scores of two groups of students.

**Westlake Student Scores:** 8, 10, 15, 21, 3, 15, 10, 21, 15, 20

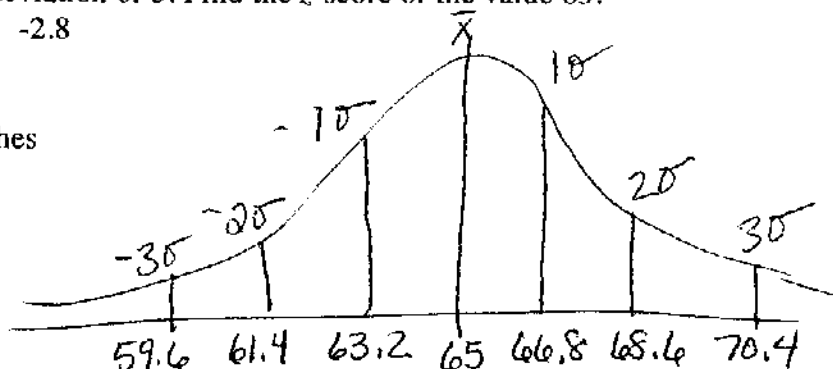
**Northshore Student Scores:** 5, 6, 19, 10, 12, 10, 12, 9, 20, 8

- Find the mean and the range of the data for the Westlake High School students and for the Northshore High School students.
- Find the standard deviation for each set of data. Round to the nearest tenth.
- Use your results from parts a and b to compare the scores of the students from the two high schools.

- A) Westlake mean = 13.8      range = 18  
 NorthShore mean = 11.1      range = 15
- B) Westlake  $\sigma = 5.7$       NorthShore  $\sigma = 4.7$
- C) Westlake students had a higher mean score & a larger variation in scores as shown by the larger range & standard deviation. Northshore students had a lower mean score & less variation.

- B 9. A set of data has mean of 51 and standard deviation of 5. Find the z-score of the value 65.  
 a. 14 b. 2.8 c. 1.2 d. -2.8

10. The average height of a corn stalk is 65 inches with a standard deviation of 1.8 inches. Sketch a normal curve labeling the x-axis at one, two, and three standard deviations from the mean.



11. A seed company is studying the maturation rate of their corn seed. Modern corn hybrids are affected by temperature. Heat units can be used to compare hybrids for adaptation and are often expressed as growing degree days (GDD).

The company planted the seeds in multiple tests and recorded the GDD. The results are as follows:

112, 115, 125, 118, 110, 112, 123, 112, 130, 108, 116, 118, 125, 112, 111, 120, 114, 116, 112, 115, 120, 122, 110, 135, 112, 112, 110, 118, 120, 110, 109, 112, 107, 119, 113

The company wants you to complete a statistical analysis of the data. Find the following:

Mean = 115.8

Median = 114

Mode = 112

Min = 107

Max = 135

Q1 = 112

Q3 = 120

$\sigma$  = 6.27

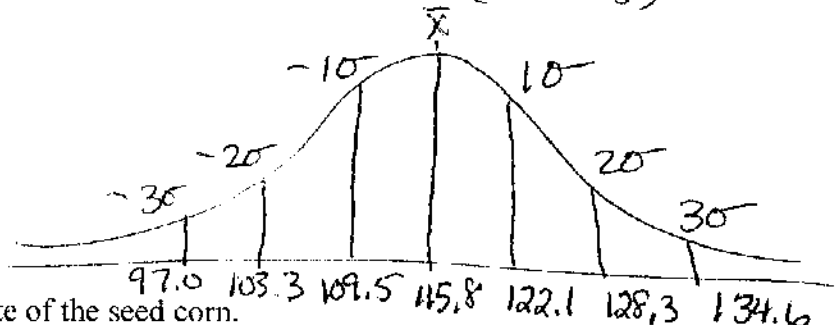
range = 28

IQR = 8

Outliers? 135

$$\begin{aligned} 112 - (1.5 \times 8) &= 100 \\ 120 + (1.5 \times 8) &= 132 \end{aligned}$$

Sketch a normal distribution of the data with labeling the x-axis with 1, 2, and 3 standard deviations from the mean.



Use the results to analyze the maturation rate of the seed corn.

The average GDD is around 115. The outlier of 135 does increase the mean from 115.2 to 115.8, however, it is still a good indicator of the average. The spread of the data is 28 GDD from the highest to lowest values & a smaller spread from Q<sub>1</sub> to Q<sub>3</sub> of 8. 77% of the data is within 1 standard deviation of the mean, 92% is within 2, & 97% is within 3.