

A person is trying to find new employees to work for his company. She wants to show applicants a statistic about how much her employees make. Which measure of a center would be the best to describe salaries at her company if she knows that 10 of her employees make the following annual salaries?

\$11,000   \$10,000   \$91,000   \$92,000   \$80,000  
\$81,000   \$88,000   \$93,000   \$91,000   \$73,000

- a) MEAN = *\$71,000*      b) MEDIAN = *\$84,500*      c) MODE = *\$91,000*

d) Which center measure is most appropriate and why? *median → the median is the best measure of center whenever your data is skewed like this or if it has outliers*

2) A company is selling boxes of crackers and wishes to list the number of crackers that they are contained in a box. A market research found 20 different boxes. Each box contained the following number of crackers. What number should they list on the box as the number of crackers in the box mean median or mode?

45 50   48 50   50 50   51 50   50 50  
49 50   50 51   50 50   50 54   50 51

- a) MEAN = *49.95*      b) MEDIAN = *50*      c) MODE = *50*

d) Which center measure is most appropriate and why? *mean → the mean is the best measure of center when your data is symmetric with no outliers like this data set*

3) A student has the following grades in a Math class:

94 92   85 90   96 94   100 92   0 80

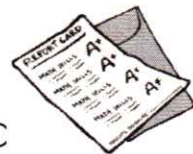
- a) MEAN = *82.3*      b) MEDIAN = *92*      c) MODE = *92, 94*

d) Which measure of center do you think should be used to determine the students grade and why? *median → there is an outlier in our data set*

4) A student has the following grades in a Math class:

70, 72, 68, 67, 71, 98, 100, 92, 71, 88

- a) MEAN = *79.7*      b) MEDIAN = *71.5*      c) MC  
MODE = *71*



d) Which measure of center do you think should be used to determine the students grade and why? median → data is a little skewed

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5) A college wanted to list a meaningful statistic in a brochure showing the ages of the students attending their college. Below is a random sample of their students:

20, 24, 23, 26, 24, 29, 19, 21, 66, 62, 24, 28, 20, 67, 22, 20, 20, 79, 20, 20

a) MEAN = 31.7

b) MEDIAN = 23.5

c) MODE = 20



d) Which measure of center do you think should be used on the brochure and why? median → the data is skewed (there may even be an outlier)

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6) A student scored 92, 85, and 87 on their first three tests. What would they need to make on their fourth test to have an 'A' test average (90%)?

$$\frac{92 + 85 + 87 + x}{4} \geq 90$$

$$\frac{264 + x}{4} \geq 90$$

$$264 + x \geq 360$$

$$x \geq 96$$

They need to score at least a 96.

7) Consider the data set 5, 2, 8, 14, 11

a) What is the mean of the data set?

$$\bar{x} = 8$$

b) What is the median of the data set?

$$\text{med} = 8$$

c) If 3 were added to each number in the data set, what effect would this have on the mean and the median? What effect would this have on the standard deviation and interquartile range?

mean & median would increase by 3

standard dev. & iqr would remain the same

d) If each number in the data set was doubled, what effect would this have on the mean and the median? What effect would this have on the standard deviation and interquartile range?

they would all double



8) A math teacher must make a recommendation for a \$2000 scholarship to a local chamber of commerce. The teacher has two students in mind **Alan** and **Brianna**. The teacher decides to let their grades be the determining factor.

Here are their test scores for the semester:

**Alan:** 90, 90, 80, 100, 99, 81, 98, 82      **Brianna:** 90, 90, 91, 89, 91, 89, 90, 90



a) Which student has the higher arithmetic **mean**, (average ( $\bar{x}$ ))?

Alan: 90

Brianna: 90

they have the same mean

b) Which student has the higher **median**?

Alan: 90

Brianna: 90

they have the same median

c) What is **RANGE** of the data set?

Alan: 20

Brianna: 2

d) What is the **IQR** of each data set?

Alan: 17

Brianna: 1

e) What is the **STANDARD DEVIATION** of each data set?

Alan: 8.37

Brianna: 0.74

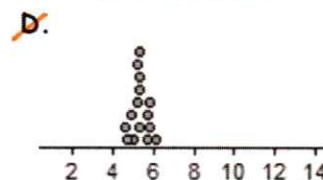
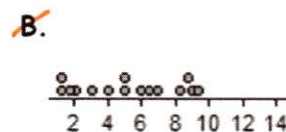
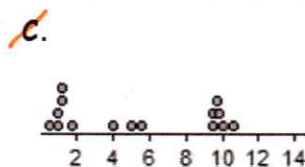
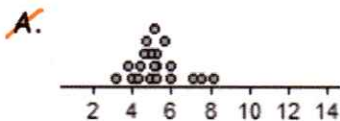
9) Matching: Use the following dot plots to estimate which of each of the following distributions corresponds to which given standard deviation?

a.  $\sigma \approx 0.43 \rightarrow D$

b.  $\sigma \approx 1.22 \rightarrow A$

c.  $\sigma \approx 2.91 \rightarrow B$

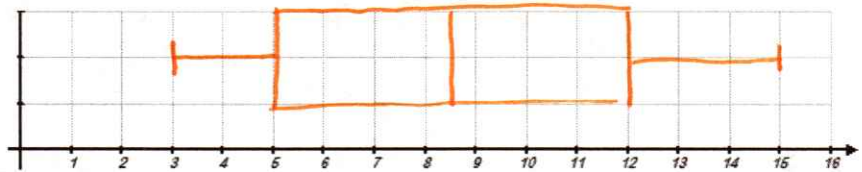
d.  $\sigma \approx 4.08 \rightarrow C$



10) Create a box and whisker plot of the following data set.

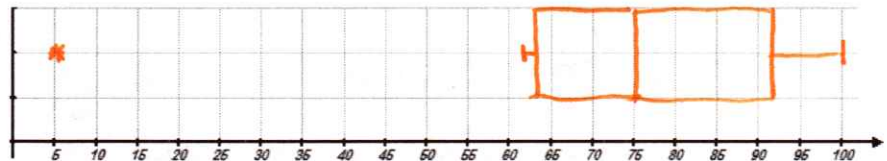
5, 9, 14, 12, 10, 3, 15, 5, 8, 7

min = 3  
 Q1 = 5  
 med = 8.5  
 Q3 = 12  
 max = 15



11) Given the data set, 5, 80, 75, 62, 64, 90, 75, 94, 100, determine which if any of the data points are outliers by definition ( $Outlier < Q_1 - 1.5 \cdot IQR$  or  $Q_3 + 1.5 \cdot IQR < Outlier$ ) and create a Modified Box and Whisker Plot.

min = 5  
 Q1 = 63  
 med = 75  
 Q3 = 92  
 max = 100



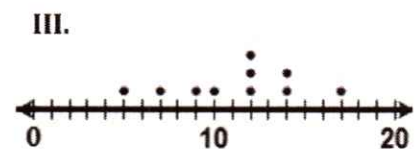
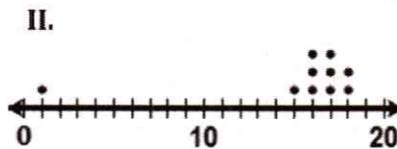
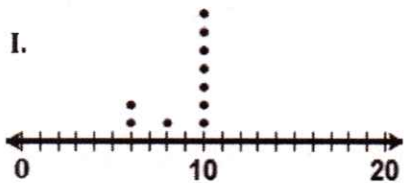
LB =  $Q_1 - 1.5(IQR) = 17.5 \rightarrow 5$  is an outlier  
 UB =  $Q_3 + 1.5(IQR) = 135.5$

12) Match the following data sets represented in the dot plots below with the most appropriate measure of center based solely on the data.

II A. MEAN

III B. MEDIAN

I C. MODE

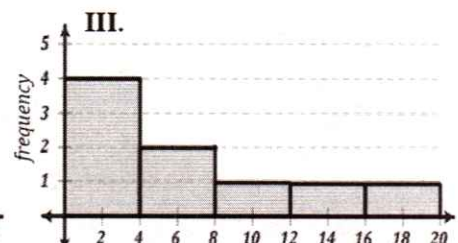
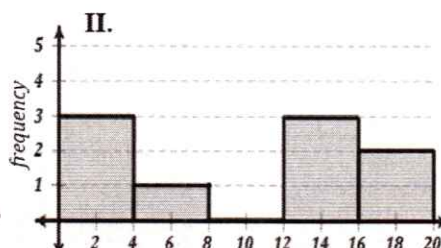
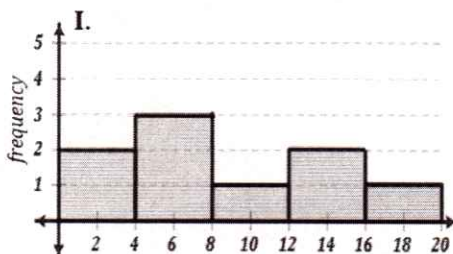


13) Match each data set with the appropriate histograms below.

II A. {2, 2, 3, 4, 12, 14, 14, 16, 19}

III B. {1, 2, 3, 3, 4, 5, 8, 14, 17}

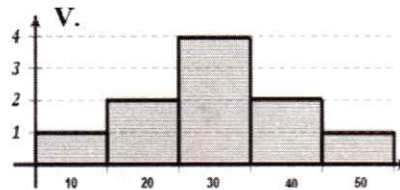
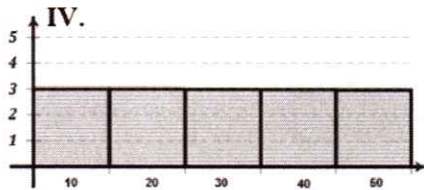
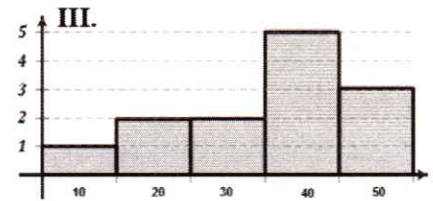
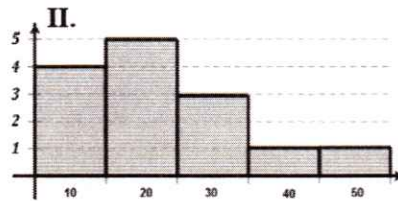
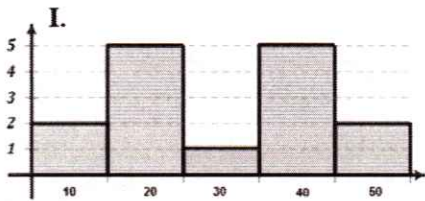
I C. {1, 2, 4, 4, 6, 10, 12, 15, 18}



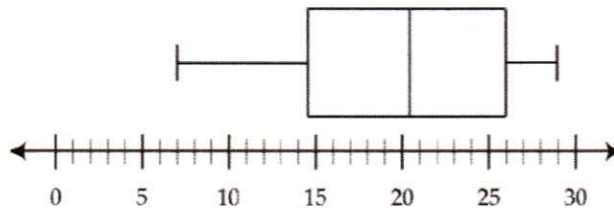
14) Match each distribution name with each histogram shown below.

V A. Symmetric Normal    II B. Skewed Right    III C. Skewed Left

I D. Bi-modal    IV E. Uniform



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



a) Which cost is the upper quartile?

**\$26**

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

**\$22**

c) What is the median?

**\$20.50**

d) Which cost represents the 25th percentile?

**\$14.50**

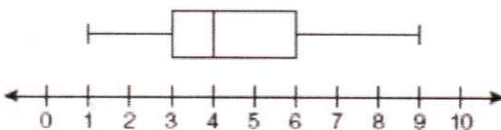
e) How many CD's cost between \$14.50 and \$26.00?

**$12(0.5) = 6$  CD's**

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

**$12(0.25) = 3$  CD's**

16) 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.