

Sunday, November 12, 2017
4:42 PM

Name: _____ **KEY** _____ Date _____ Period _____

1. What are the three measures of *spread*? Standard deviation, IQR and range

2a. What does the *range* measure? Spread - max minus the min value.

b. What does the *inner quartile range* measure? Spread - The range of the middle 50% of the data.

c. What does the *standard deviation* measure? Spread -
Measures the typical distance of the values in a distribution from from mean.

3a. If a set of data has a small *variance*, what does that tell you about the *standard deviation*?
Since they both measure spread, the standard deviation will be small as well.

b. How do you find *variance* given the *standard deviation*?
Square the standard deviation. $s = \text{standard deviation}$ $s^2 = \text{variance}$

c. How do you find *standard deviation* given the *variance*?
Take the square root of the variance.

4. The *variance* of 14 students' height (in inches) is computed to be 36.

What is the *standard deviation*? $s^2 = 36$ $s = \sqrt{36} = 6$
variance standard deviation

5. What are the three measures of *center*? mean, median & mode.

6a. What does the *mean* measure? The *center* - the arithmetic average.

b. What does the *median* measure? The *center* - the midpoint of a distribution.

c. What does the *mode* measure? The *center* - the most common data value.

7. Why is the *mean* also called the *balance point*?

If you were to add up the distances between each data point & the mean, the sum on either side (left & right) of the mean would be the same.

8a. If the graph of a set of data is *skewed to the right*, how does the *mean* compare to the *median*?
The mean would get pulled to the right, so it would be greater than the median.

b. If the graph of a set of data is *skewed to the left*, how does the *mean* compare to the *median*?
The mean would get pulled to the left, so it would be less than the median.

9. The height of basketball players on a team are as follows:

Height (inches)	70	71	72	73	74	75
# of Players	1	2	6	9	9	3

- a. What is the *mean* height? $\bar{x} = 73.0667$ * enter into a LIST: 70, 71, 71, 72, 72, 72, 72, 72, 72, ...
- b. What is the *median* height? med = 73 * STAT CALC 1VAR STAT
- c. What is the height's *mode*? 73, 74

10. You have the following grades in your Statistics Honors class: 85, 73, 97, 100. You want to end the marking period with an average of 90. What grade do you need to earn on the last assessment?

$$\frac{85 + 73 + 97 + 100 + x}{5} = 90$$

$$\frac{355 + x}{5} = 90$$

$$450 = 355 + x$$

$$-355 \quad -355$$

$$x = 95$$

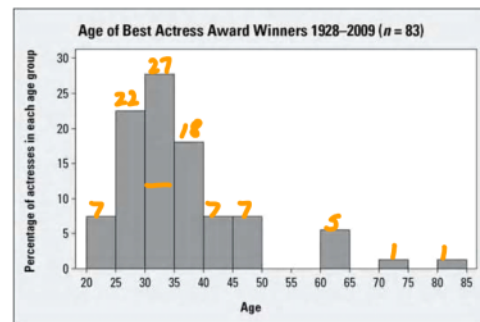
You need to get a 95 on your last assessment.

11a. For this distribution, what would be the **best** measure of center? Explain.

The median because the distribution is skewed to the right. The median is resistant to skewedness & outliers.

b. Find the *center* of this distribution.

The median would fall in the [30,35) class.



12. Here are the MATH SAT test scores of 10 randomly chosen students:

630 570 660 700 740 600 470 750 590 600

470 - 750

a. To make a *stemplot* of these scores, what *range of numbers* would you use for the *stems*?

4-7

b. Create the *stemplot* below.

math SAT scores for
10 Randomly chosen Students

4	7
5	7 9
6	0 0 3 6
7	0 4 5

KEY : 4 | 7 =
an SAT score
of 470

13. What are the values used in the *five-number summary*?

min , Q1 , Median , Q3 , max



* Look at a boxplot of the above data to help answer these questions!

14a. 75% percent of the scores in a distribution are between the 1st & 4th quartile.

b. 50% percent of the scores in a distribution are between the 1st & 3^d quartile. (IQR)

c. 25% percent of the scores in a distribution are between the 1st & 2nd quartile.

- 15a. Using the data from the dotplot below, construct a boxplot on your graphing calculator and draw below.

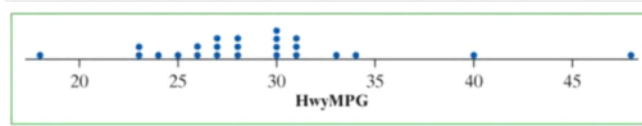
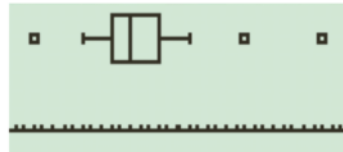


Figure 1.9 Dotplot displaying EPA estimates of highway gas mileage for model year 2012 midsize cars.



- b. Describe the distribution:

Shape: Skewed to the right
Outliers: Outliers at 18, 40, 48 mpg.
Center: Median = 28 mpg * use median due to skewedness and outliers!
Spread: IQR = $Q3 - Q1$
 $= 31 - 26$
 $= 5$ mpg * use IQR due to skewedness and outliers!

- c. What is the best measure of center & spread? Justify your reasoning.

The median should be used for center and the IQR for spread because they are resistant to the outliers & skewedness.

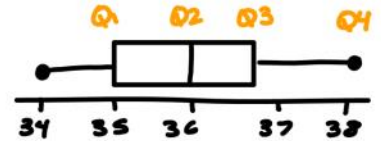
16. When adding a constant to all values in a data set, describe how this will affect the:

- a. mean: The mean (center) will increase by the value of the constant.
- b. standard deviation: The spread will not change.

17. When multiplying a constant to all values in a data set, describe how this will affect the:

- a. mean: The mean will get multiplied by the constant.
- b. standard deviation: The std. deviation will also get multiplied by the constant.

18. The *five-number summary* for the length (mm) of yellow roses are:



Length of Yellow Roses: 34, 35, 36, 36.8, 38

- a. About what percent of roses are between 35 mm and 36.8 mm? 50% *IQR: Q3-Q1*
- b. About what percent of roses are between 34 mm and 36.8 mm? 75%
- c. About what percent of roses are between 36.8 mm and 38 mm? 25%

19. Below are *side-by-side boxplots* describing the number of texts messages sent in a 2-day period by males and females students.

Number of Texts Sent by Males & Females in a 2-Day Period

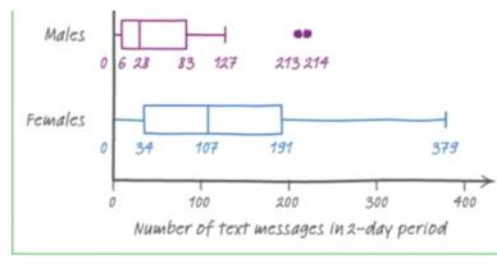


Figure 1.21 Parallel boxplots of the texting data.

Decide whether each statement is **true** or **false** about the *side-by-side boxplots* above.

- Male: Q3-Q1 = 83-6 = 77 Female: Q3-Q1 = 191-34 = 157 77x2 = 154 ✓*
- a. The *IQR* of female boxplot is over twice the *IQR* for the male boxplot. TRUE
- male: 214-0 = 214 Female IQR = 157*
- b. The **range** of the males boxplot is smaller than the *IQR* of the female boxplot. False
- c. **75%** of the texts in the male distribution are longer than the *median* texts in the female distribution. False *median Female = 107 texts*
only a small # of males sent more than 107 texts.
- d. The largest amount of texts in the female distribution is larger **25%** of the texts in the male distribution. False
Largest amount of female texts = 379
larger than all of the male texts

20. What are the **two characteristics** that must be true to have a *valid density curve*?

1) The density curve is always on or above the horizontal axis.

2) The density curve has an area of exactly one underneath it.

21. Describe the *Empirical Rule* when the data lies within one, two, or three *standard deviations* in a *normal distribution*.

$\mu \pm 1\sigma =$ Approximately 68% of the observations fall within 1 standard deviation of the mean.

$\mu \pm 2\sigma =$ Approximately 95% of the observations fall within 2 standard deviations of the mean.

$\mu \pm 3\sigma =$ Approximately 99.7% of the observations fall within 3 standard deviations of the mean.

22. What is the *mean* and *standard deviation* for a *standard normal curve*?

$\mu =$ 0

$\sigma =$ 1

23. You have a set of data that is $N(0,1)$. What percent of the data lies between -2 and 3?

