**Guided Notes: 1.3 Describing Quantitative Data with Numbers**

**Measuring Center: The Mean**

The most common measure of center is the ordinary arithmetic average, or **mean.**

** ON AP EXAM: **

**Measuring Center: The Median**

Another common measure of center is the **median**.

The **median M** is the midpoint of a distribution, the number such that half of the observations are smaller and the other half are larger.

To find the median of a distribution:

1. Arrange all observations from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. If the number of observations *n* is odd, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. If the number of observations *n* is even, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Comparing the Mean and the Median**

1. The mean and median of a roughly symmetric distribution \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. If the distribution is exactly symmetric, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. In a skewed distribution, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Measuring Spread: The Interquartile Range (*IQR*)**

To calculate the **quartiles**:

1. Arrange the observations in increasing order and locate the median *M*.
2. The **first quartile *Q1***is the median of the observations located to the left of the median in the ordered list.
3. The **third quartile *Q3*** is the median of the observations located to the right of the median in the ordered list.

The **interquartile range (*IQR*)** is defined as: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**The 1.5 x IQR Rule for Outliers**

Call an observation an outlier if it falls more than 1.5 x IQR above the third quartile or below the first quartile.

The **five-number summary** of a distribution consists of the smallest observation, the first quartile, the median, the third quartile, and the largest observation, written in order from smallest to largest.

***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

Ex 1. McDonald’s Beef Sandwiches

Here are data for the amount of fat (in grams) for McDonald’s beef sandwiches:

|  |  |
| --- | --- |
| **Sandwich** | **Fat (g)** |
| Hamburger | 9 g |
| Cheeseburger | 12 g |
| Double Cheeseburger | 23 g |
| McDouble | 19 g |
| Quarter Pounder® | 19 g |
| Quarter Pounder® with Cheese | 26 g |
| Double Quarter Pounder® with Cheese | 42 g |
| Big Mac® | 29 g |
| Big N' Tasty® | 24 g |
| Big N' Tasty® with Cheese | 28 g |
| Angus Bacon & Cheese | 39 g |
| Angus Deluxe | 39 g |
| Angus Mushroom & Swiss | 40 g |
| McRib ® | 26 g |
| Mac Snack Wrap | 19 g |

**Find the mean amount of fat total for all 15 beef sandwiches.**

**The three Angus burgers are relatively new additions to the menu. How much did they increase the average when they were added?**

**Find and interpret the median.**

**Find the five-number summary.**

**Are any outliers present?**