**Barron’s Let’s Review Regents – Algebra I**

# Chapter 13: Statistics

## 13.1 Measures of Central Tendency

A measure of central tendency is a number that summarizes a list of numbers. Since one number cannot describe everything about a set of data, there are many different measures of central tendency.

**(Sample) Mean**

The *mean* of a data set is also known as the arithmetic mean or the average. To calculate the mean, add up all the numbers in the data set and divide that result by the amount of numbers in the set. The symbol for the mean is .

**Mode**

The *mode* of a data set is the most “popular” number.

**Median**

The *median* is the “middle” number after the numbers have been arranged from least to greatest.

If the list has an even amount of numbers, add the two middle numbers and divide by 2.

**Quartiles**

The *median* is also called the *second quartile* since it is the number that is greater than 50% of the numbers in the set. The *first quartile* is the number that is greater than 25% of the numbers in the list The *third quartile* is the number that is greater than 75% of the numbers in the list.

**Interquartile Range**

The difference between the third quartile and the first quartile is called the *interquartile range*.

**Using the Graphing Calculator to determine the Maximum, Minimum, Median, First Quartile, and Third Quartile**

To calculate the maximum, minimum, median, first quartile (Q1), and third quartile (Q3) in Excel, use these formulas: =MAX(data\_range), =MIN(data\_range), =MEDIAN(data\_range), =QUARTILE.INC(data\_range,1), and =QUARTILE.INC(data\_range,3) respectively.

To calculate the population and sample mean in Excel, use the AVERAGE function for both, but be sure to use the correct data range: AVERAGE(data\_range) for sample mean and AVERAGE(population\_data\_range) for population mean.

1. Understanding the Concepts:

**Population Mean:**

The average of all values within the entire group or dataset you are analyzing.

**Sample Mean:**

The average of values within a subset or sample taken from the larger population.

**Calculating the Standard Deviation**

When the numbers in a data set are very close together, the data set is said to have a low standard deviation.

The is for the sample standard deviation, and the (symbol is sigma) is for the population standard deviation.

**Population Mean**

The population mean is denoted as (mu).

|  |  |
| --- | --- |
| N | = the size of the population |
|  | = each value from the population |
|  | = the population mean |

**Population Standard Deviation**

|  |  |
| --- | --- |
|  | = population standard deviation |
| N | = the size of the population |
|  | = each value from the population |
|  | = the population mean |

**Two-Way Frequency Tables**

A *two-way frequency table* is a good way to organize collected data from a survey. Instead of just displaying the results, the two-way frequency table is more specific, displaying how certain categories of people responded to the survey.

Interpreting a two-way frequency table based on a survey given to 40 menu and 60 women about whether or not math is their favorite subject.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Yes** | **No** | **Total** |
| Men | 32 | 8 | 40 |
| Women | 54 | 6 | 60 |
| Total | 86 | 14 | 100 |

**Creating a Two-Way Frequency Table**

**Creating a Relative Two-Way Frequency Table**

A relative two-way frequency table is much like a regular two-way frequency table except that all the numbers are recorded as percentages of the total.

To convert the table from the last section into a relative two-way frequency table, divide each number by the total, which is 12.

### Check Your Understanding of Section 13.1

1. Multiple-Choice
2. Find the mean of this set of numbers  
   { 4, 5, 8, 8, 8, 10, 10, 13, 15, 17, 23 }.  
   **(4) 11**
3. Find the median of this set of numbers  
   { 4, 5, 8, 8, 8, 10, 10, 13, 15, 17, 23 }.  
   **(2) 10**
4. Find the mode of this set of numbers  
   { 4, 5, 8, 8, 8, 10, 10, 13, 15, 17, 23 }.  
   **(4) 8**
5. Find the first quartile of this set of numbers  
   { 4, 5, 8, 8, 8, 10, 10, 13, 15, 17, 23 }.  
   **(1) 8**
6. Find the third quartile of this set of numbers  
   { 4, 5, 8, 8, 8, 10, 10, 13, 15, 17, 23 }.  
   **(2) 15**
7. Find the interquartile range of this set of numbers: { 4, 5, 8, 8, 8, 10, 10, 13, 15, 17, 23 }.  
   15 – 8 = 7  
   **(1) 7**
8. For the first fourd days of a five-day vacation, the mean temperature was 80 degrees. What must be the terperature be on the fifth day in order for the man temperature to be 82 degrees?  
   (4\*80)+x)/5 = 82  
   320+x = 410  
   x = 90  
   **(3) 90**
9. What is the median of the set of numbers   
   { 12, 4, 8, 3, 1, 4, 9, 5 }?  
   { 1, 3, 4, 4, 5, 8, 9, 12 }  
   (4 + 5)/2 = 4.5  
   **(4) 4.5**
10. In a set of seven numbers, the largest number is increased by 10. Which measure of central tendency must increase because of this?  
    **(1) Mean**
11. What is the sample standard deviation, rounded to the nearest hundredth of this data set: 20, 25, 28, 30, 32, 40?  
    Microsoft Excel: =STDEV.S(A1:A6)  
    **(2) 6.77**