

## Stat Support Activity: Other Common Quantitative Statistics

### Notes: Other common quantitative statistics

- **Variance ( $s^2$ ):** A measure of spread for quantitative data that is the square of the typical distance from the mean.
  - To calculate the variance: Square the standard deviation.
  - Used in ANOVA testing (Analysis of Variance).
  - Only accurate if the quantitative data is normally distributed (bell-shaped).
  - Example: Normal data, standard deviation = 1.784 cm. Variance =  $(1.784)^2 = 1.784 \times 1.784 = 3.182656$
- **Mode:** The number or numbers that appear most often in a quantitative data set.
  - A measure of center or average used with bi-modal or multi-modal shaped data.
  - A quantitative data set can be no mode, 1 mode, 2 modes, or multiple modes.
  - To calculate the mode: Look for the data value that appears most often. It helps to put the data in order from smallest to largest.
  - Example: 1,2,3,3,4,5,6,7,7,8,10 (There are two modes 3 and 7.)
  - Example: 13,14,16,17,18,19,20 (There is no mode since all data values appear the same number of times.)
  - Example: 0, 1.5, 1.5, 2.0, 2.4, 2.9, 2.9, 2.9, 3.1, 3.1 (There is one mode at 2.9)
- **Max:** The largest value in a quantitative data set.
  - Measure of Position.
  - Example: 13,14,16,17,18,19,20 (Max is 20.)
- **Min:** The smallest value in a quantitative data set.
  - Measure of Position.
  - Example: 13,14,16,17,18,19,20 (Min is 13.)
- **Range:** A quick, easy to calculate, measure of non-typical spread.
  - Based on outliers, so does not give us typical values in the data set.
  - Better to use standard deviation (normal data) or IQR (non-normal data) for spread.
  - To calculate Range: Max – Min.
  - Example: 3,14,16,17,18,19,37 (Min = 3, Max = 37, Range =  $37 - 3 = 34$ )
- **Midrange:** A quick, easy to calculate, measure of center or average.
  - Half way between the max and min.
  - Based on outliers, so is often not very accurate.
  - Better to use the median average (non-normal data) or mean average (normal data).
  - To calculate Midrange:  $(Max + Min) \div 2$
  - Example: 3,14,16,17,18,19,37 (Min = 3, Max = 37, Midrange =  $(37 + 3) \div 2 = 40 \div 2 = 20$ )

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### Problems

1.

Weights Data (kilograms):

1.4 , 1.75 , 1.9 , 2.24 , 2.5 , 2.8 , 3.05 , 3.21 , 3.3 , 3.52 , 3.6 , 3.87 , 4.1 , 4.37

- a) Find the Mode or Modes.
- b) Find the Max.
- c) Find the Min.
- d) Calculate the Range = Max – Min
- e) Calculate the Midrange =  $(\text{Max} + \text{Min}) \div 2$

2.

Temperature Data (degrees Fahrenheit):

42 , 44 , 51 , 52 , 53 , 53 , 56 , 63 , 64 , 68 , 72 , 72 , 72 , 79 , 81 , 81 , 85

- a) Find the Mode or Modes.
- b) Find the Max.
- c) Find the Min.
- d) Calculate the Range = Max – Min
- e) Calculate the Midrange =  $(\text{Max} + \text{Min}) \div 2$

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3.

Here is a quantitative data set describing the milligrams of potassium per serving in cereals. The data has already been put in order from smallest to largest. Here are the summary statistics calculated from StatKey.

### Potassium (milligrams per serving)

25  
25  
30  
35  
35  
35  
40  
40  
45  
55  
90  
90  
90  
95  
95  
105  
110  
110  
115  
120  
130  
160  
170  
230

### Summary Statistics

Statistic	Value
Sample Size	24
Mean	86.458
Standard Deviation	52.822
Minimum	25
Q <sub>1</sub>	37.500
Median	90.000
Q <sub>3</sub>	112.500
Maximum	230

- Find the Mode or Modes.
- Find the Max.
- Find the Min.
- Calculate the Range = Max – Min
- Calculate the Midrange =  $(\text{Max} + \text{Min}) \div 2$
- Use the Standard Deviation listed to calculate the Variance.

## Stat Support Activity: Other Common Quantitative Statistics

4.

Here is a quantitative data set listing the weights of some COC students. The data has already been put in order from smallest to largest. Here are the summary statistics calculated from StatKey.

Weight (in pounds)
103
106
109
110
114
120
120
125
135
135
144
149
155
155
165
170
172
180
185
190
200
250
270

### Summary Statistics

Statistic	Value
Sample Size	23
Mean	154.870
Standard Deviation	44.145
Minimum	103
Q <sub>1</sub>	120.000
Median	149.000
Q <sub>3</sub>	176.000
Maximum	270

- Find the Mode or Modes.
- Find the Max.
- Find the Min.
- Calculate the Range = Max – Min
- Calculate the Midrange =  $(\text{Max} + \text{Min}) \div 2$
- Use the Standard Deviation listed to calculate the Variance.