

3.2 – Measures of Variation

– **measures of variance** → represents how _____ a set of data is.

- range – represents the _____
- variance (σ^2) – describe how far the _____ and represented by $\sigma^2 = \frac{\sum (x - \bar{x})^2}{n}$
- standard deviation (σ) – same description as variance but represented by $\sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{n}}$

Note: You can do this by hand using formulas above but using the 1-Variable Stats in calculator will be faster and more efficient. I expect you to find the variance and standard deviation via calculator.

Examples: Find the measures of variance for each set of data to answer question(s) about variance.

1.) Use the following list of numbers:

6.9 , 8.7 , 7.6 , 4.8 , 9.0

a.) range = _____ std. dev = _____ vari = _____

b.) Within how many standard deviations from the mean does all the numbers fall? _____

2.) Below are the weights of different offensive lineman of football teams from three high schools:

| | | |
|------------------------------------|---------------------------------------|---------------------------------|
| Jackson 170, 165, 140, 188, 195 | Washington 144, 177, 215, 225, 197 | King 166, 175, 196, 206, 219 |
|------------------------------------|---------------------------------------|---------------------------------|

a.) SD = _____ SD = _____ SD = _____

b.) How would the school with the most variation of weights impact their play for games?

3.) Table shows the population in millions of different states from the 2000 Census:

| State | Population | State | Population | State | Population |
|-------|------------|-------|------------|-------|------------|
| NY | 19.0 | MD | 5.3 | RI | 1.0 |
| PA | 12.3 | CT | 3.4 | DE | 0.8 |
| NJ | 8.4 | ME | 1.3 | VT | 0.6 |
| MA | 6.3 | NH | 1.2 | — | — |

a.) range = _____ std. dev = _____ vari = _____

b.) How many states fell within two standard deviations from the mean? _____

c.) What percent of the states fell within one standard deviation from the mean? _____

4.) Table shows the class scores on a test:

| Score | Frequency |
|-------|-----------|
| 90 | 3 |
| 85 | 2 |
| 80 | 3 |
| 75 | 7 |
| 70 | 6 |
| 65 | 4 |

a.) range = _____ std. dev = _____ vari = _____

b.) What percent of the scores fell within one standard deviation from the mean? _____

c.) What percent of the scores fell within two standard deviations from the mean? _____