Statistical Reasoning Name:
Chapter Two – Summary Statistics Guided Notes

Summary Statistics – *summarize and provide information about the data/sample data*

Five Number Summary – *a set of five summary statistics that give us information about the most important percentiles (quartiles) of the data/sample data*

- Minimum - smallest # (min)
- Lower Quartile - middle of lower half (Q1)
- Median - middle # (med) (Q2)
- Upper Quartile - middle of upper half (Q3)
- Maximum - largest # (max) (Q4)

- Range - max − min
- Interquartile Range – *measure of how spread out the data are* IQR = Q3 − Q1
- Mean - average ($\bar{x}$)
- Standard Deviation – *measure of how spread out the data are* s_x

Calculating Standard Deviation by Hand:

Calculate the standard deviation of the following test data by hand. Use the chart below to record the steps. Test Scores: 22, 99, 102, 33, 57, 75, 100, 81, 62, 29

Mean: 66 n: 10

Test Score (x)	Distance from Mean $(x - \bar{x})$	Distance from Mean Squared $(x - \bar{x})^2$
22 − 66 =	−44	1936
99 − 66 =	33	1089
102 − 66 =	36	1296
33	−33	1089
57	−9	81
75	9	81
100	34	1156
81	15	225
62	−4	16
29	−37	+ 1369
	Sum of Difference from the Mean Squared	8338

$$\frac{8338}{10-1} = \frac{8338}{9}$$

$s_x = 926.\overline{4}$

Outliers - #s in your data set that are really small/big compared to other #s

To find outliers...

- Lower Bound = Q1 – 1.5(IQR)
- Upper Bound = Q3 + 1.5(IQR)

Outliers are numbers that are lower than the lower bound and higher than the upper bound.

The heights of 15 basketball players are given below, in inches. Find the five number summary, mean, range, IQR, and standard deviation. Determine if there are any outliers.

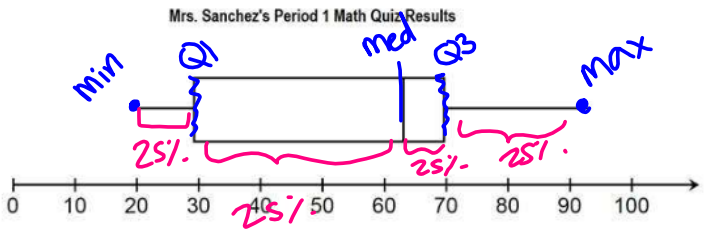
68, 70, 70, 71, 75, 82, 84, 80, 77, 75, 75, 72, 73, 68, 70

STAT
ENTER
↑ Clear ↓
Type data into L1
STAT → to Calc
1: 1 Var Stat
ENTER

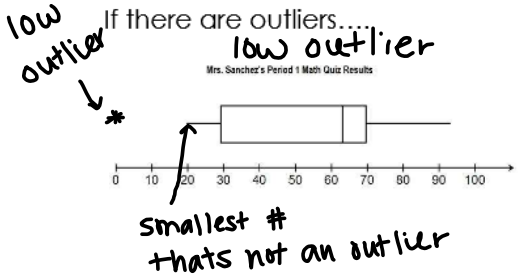
min = 68
Q1 = 70
med = 73
Q3 = 77
max = 84
$\bar{x}$ = 74
range = 16
IQR = 7
S_x = 4.97

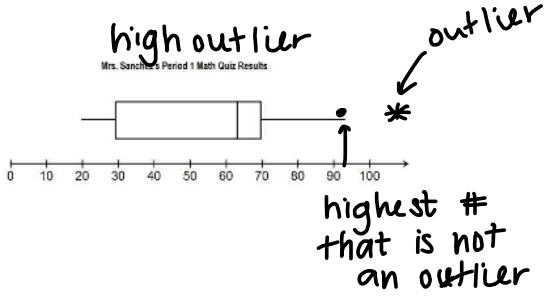
Outliers: LB = 70 − 1.5(7) = 59.5
UB = 77 + 1.5(7) = 87.5
No outliers

Box and Whisker Plots (AKA: Box Plots) – *a graphical representation of the five number summary*



If there are outliers....





The following is a list of hours college students study in one week.

12, 15, 19, 6, 23, 13, 1, 15, 18, 10, 13, 16, 14

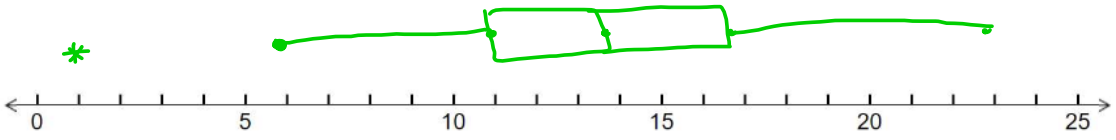
Find the five number summary, mean, standard deviation, range, and IQR. Determine if there are any outliers. Then create a box plot.

min: 1 Q1: 11 med: 14 Q3: 17 max: 23

mean: 13.46 or 13.5 S_x: 5.622 range: 22 IQR: 6

Outliers: 1

LB = 11 − 1.5(6) = 2
UB = 17 + 1.5(6) = 26



The following is a list of average monthly rainfalls in different cities in millimeters.

122, 143, 70, 98, 84, 126, 114, 98, 85, 104, 71, 77, 111, 108

Find the five number summary, mean, standard deviation, range, and IQR. Determine if there are any outliers. Then create a box plot.

min: 70 Q1: 84 med: 101 Q3: 114 max: 143

mean: 100.79 or 100.8 S_x: 21.762 Range: 73 IQR: 30

Outliers: None

LB = 84 − 1.5(30) = 39
UB = 114 + 1.5(30) = 159