Statistical Reasoning
Chapter Two

Name: answer key

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*

Q0 • Minimum - the smallest #

Q1 • Lower Quartile - Q1 - the median of the lower half

Q2 • Median - the middle #

Q3 • Upper Quartile - Q3 - the median of the upper half

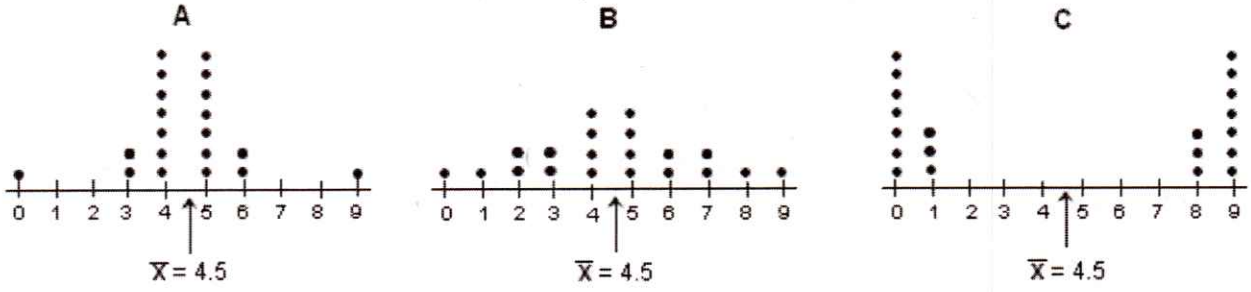
Q4 • Maximum - the biggest #

• Range - max - min

IQR • Interquartile Range – *measure of how spread out the data are* Q3 - Q1

$\bar{x}$ • Mean - average

S_x • Standard Deviation – *measure of how spread out the data are*



Compared to the other two, this data will have the smallest standard deviation because most points are very close to the mean

Compared to the other two, this data will have more deviation than Plot A, but less deviation than Plot C.

Compared to the other two, this data will have the largest standard deviation because most points are very far away from the mean

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

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

min = 68
Q1 = 70
med = 73
Q3 = 77
max = 84

$\bar{x} = 74$
$S_x = 4.97$

range = 84 - 68 = 16
IQR = 77 - 70 = 7

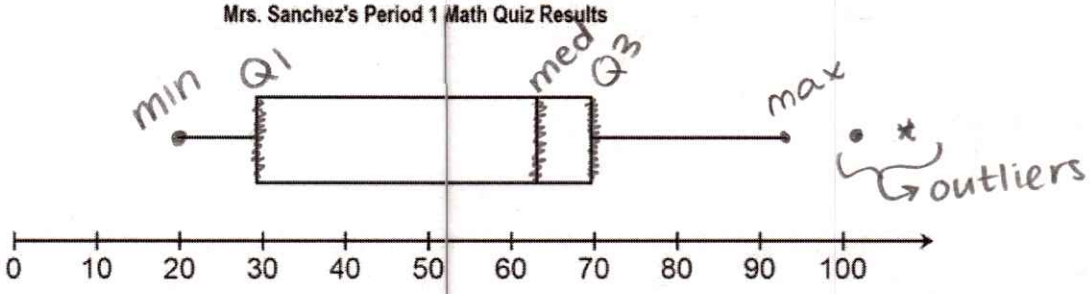
Outliers - an extreme data point (small or big)

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.

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



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

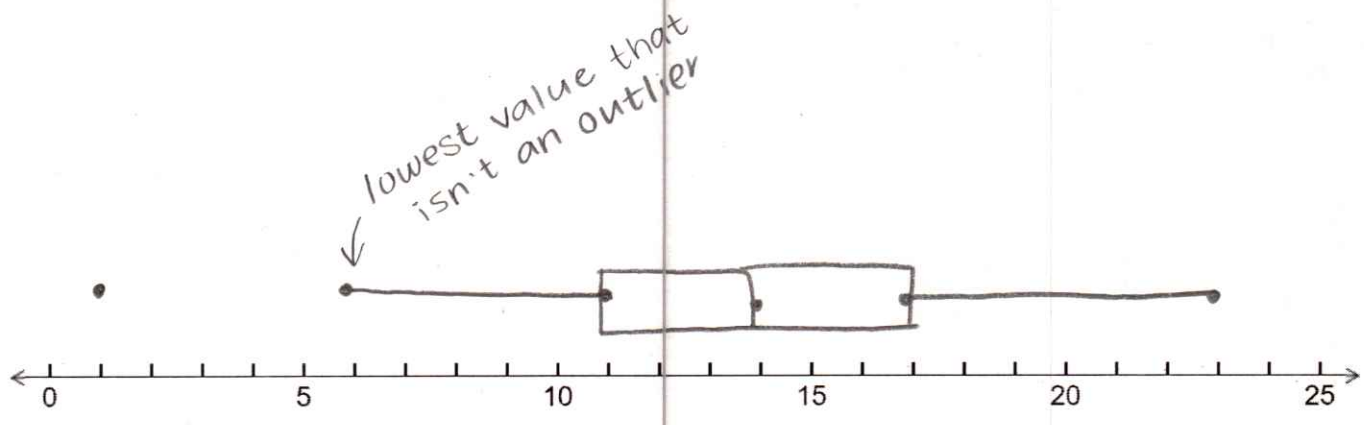
Find the five number summary, mean, standard deviation, range, and IQR. Determine if there are any outliers. Then create a box plot.

$\bar{x} = 13.46$ min = 1 Q1 = 11 med = 14 Q3 = 17 max = 23

$S_x = 5.62$ range = 23 - 1 = 22 IQR = 17 - 11 = 6

LB = 11 - 1.5(6) = 2 → 1 is an outlier

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.

$\bar{x} = 100.79$ min = 70 Q1 = 84 med = 101 Q3 = 114 max = 143

$S_x = 21.76$ range = 73 IQR = 30

LB = 84 − 1.5(30) = 39
UB = 114 + 1.5(30) = 159
} no outliers