Key

Math 1

Name _____

7-2 Box Plots

Date _____

Learning Goals:

- I can describe the center and spread of a distribution.
- I can construct and identify outliers on a scatter plot.
- I can construct a dot plot, histogram and box plot using an appropriate scale.
- I can calculate the 5-number summary for a set of data.

Use the following data on the right to complete the following questions.

Mean - 4-1-1

1. Find the 5-number summary for the rushing yards during the 2013 playoffs.

Min = 51 Q_1=68, Med = 82, Q_3=152

Max = 288

2. What is the IQR?

$Q_3 - Q_1 = 152 - 68 = 84$

When making a box plot, you typically want to know whether a point that is far from the rest of the data is an outlier. To determine this we say that anything that is 1.5 times the IQR greater than Q3 or 1.5 times smaller than Q1 is an outlier. We will now go through the steps of creating a modified box plot below.

3. In order to determine if there is an outlier we use two formulas. Calculate the answers for the equations below.

Q1 – 1.5(IQR) = 68 − 1.5(84) = −58

Q3 + 1.5(IQR) = 152 + 1.5(84) = 278

Rank	Name and Position	Team	Rushing yards for the 2013 playoffs
1	Marshawn Lynch, RB	SEA	288
2	Colin Kaepernick, QB	SF	243
3	LeGarrette Blount, RB	NE	172
4	Frank Gore, RB	SF	164
5	Knowshon Moreno, RB	DEN	158
6	Mark Ingram, RB	NO	146
7	Donald Brown, RB	IND	118
8	Khiry Robinson, RB	NO	102
9	Montee Ball, RB	DEN	96
10	Danny Woodhead, RB	SD	83
11	Eddie Lacy, RB	GB	81
12	Ryan Mathews, RB	SD	78
13	Ronnie Brown, RB	SD	77
	LeSean McCoy, RB	PHI	77
15	Stevan Ridley, RB	NE	69
16	Knile Davis, RB	KC	67
17	Alex Smith, QB	KC	57
18	Percy Harvin, WR	SEA	54
	Cam Newton, QB	CAR	54
20	Shane Vereen, RB	NE	51

278

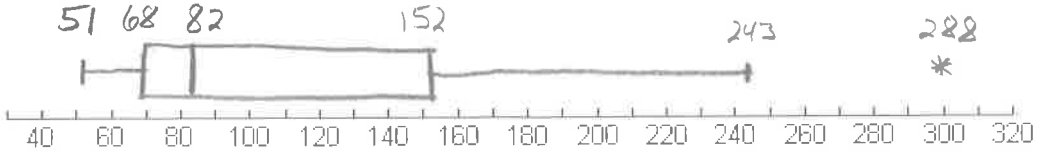
−58

4. These two values that you calculated above are considered fences. Any number smaller than Q1 – 1.5(IQR) is considered an outlier. Are there any outliers on the lower end of the data?

Nope

5. Any number larger than Q3 + 1.5(IQR) is considered an outlier. Are there any outliers on the upper end of the data? Yes! 288

6. Now create a modified box plot on the graph labeled "box plot for #7" below by only extending the whiskers to the largest and smallest data points that are not outliers. Mark the outlier(s) with a "*".



Answers vary

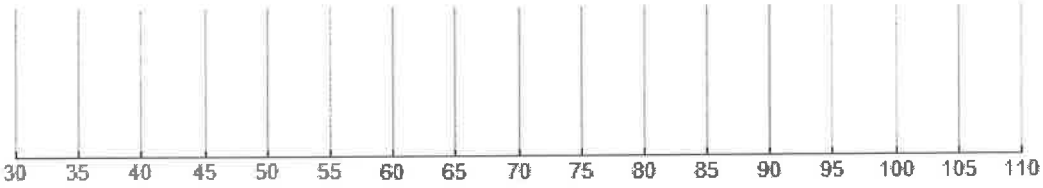
7. Take your resting pulse for 20 seconds, triple it, and record it right here → _____
   Record the resting pulse rates from your classmates below.

   a. Find the five number summary for resting pulse rates.

      Min = Q1 = Q2 (Median) = Q3 = Max =

   b. Calculate if there are any outliers.

   c. Create a box plot below for the resting pulse rates in your class.



   d. Describe the distribution of resting pulse rates. *Use **S.O.C.S.!!** However, now we should be including IQR in our description of spread. Also, in this case you do not need to calculate the mean for center, just use the median.*

8. Find the five number summary for the following data: 1, 2, 3, 4, 5, 6, 70

   Min = 1 Q1 = 2 Median = 4 Q3 = 6 Max = 70

   Range= 69

   IQR= 6 − 2 = 4

9. Remove 70 from the set and calculate the five number summary again.

   Min = 1 Q1= 2 (Median) Q2= 3.5 Q3= 5 Max= 6

   Range = 5

   IQR = 3

10. What changed more by removing the 70, the Range or the IQR?

The range + mean change a lot while the IQR + median barely change at all.