Five Number Summary & Box Plots

- The Five Number Summary is...

  the five major points of a data set that separate it into four percentiles.

  - Which is made up of...

  The Minimum, Q1, Median (Q2), Q3, and the Maximum.

- Using the Five Number Summary, we can create a ___Box Plot_____
  - How? Well...

  Q1, Q2, and Q3 create the box, while the lines connecting the min and max to the box create the "whiskers"

- Finding the Interquartile Range (IQR)

  IQR = Q3 - Q1

- Finding the lower and upper fences

  lower fence = Q1 - (1.5 x IQR)

  upper fence = Q3 + (1.5 x IQR)

- Adjusting a Box Plot into a ____Modified Box Plot_____

Create dotted lines where the fences fall, and if any data points fall outside the fence, then they become lone dots and the "whisker" is ended by the closest number inside the fence.

- Calculator Tricks (All are done AFTER entering data!!)
  - 1-Var Stats

    STAT --> CALC --> 1: 1-Var Sta

  - Plotting a Box Plot

    2nd --> Y= --> (Pick a Plot that is OFF) --> Turn ON --> Choose the 5th Option --

    To center: ZOOM -->9: ZoomStat

  - Plotting a Modified Box Plot

    Same as Plotting a Box Plot, but you choose the 4th option.

Practice

1. Find the five number summary of the data below BY HAND! (Hint: sort data first!)

[42, 17, 20, 89, 23, 56, 78, 34, 91, 65, 65, 12]

$n = \frac{12}{2} = 6\text{th}$ & 7th

12, 17, 20, 23, 34, 42, 56, 65, 65, 78, 89, 91

Min: 12

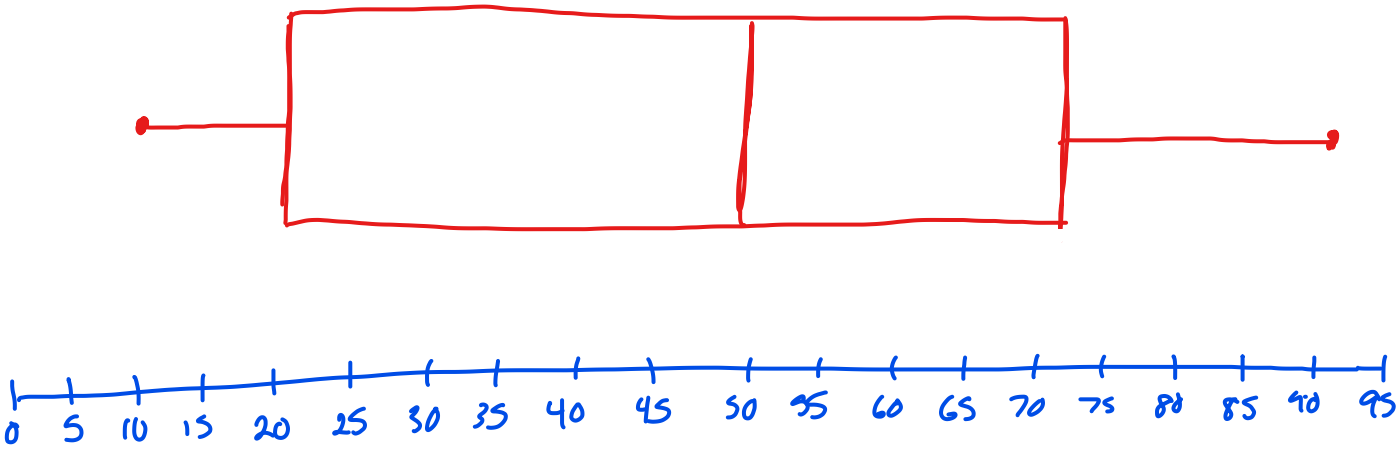
Max: 91

$\frac{20+23}{2} = 21.5$ (Q1)

$\frac{42+56}{2} = 49$ (Q2)

$\frac{65+78}{2} = 71.5$ (Q3)

2. Using question 1, draw a Box Plot.



3. Find the five number summary of the data below BY CALCULATOR!

[10, 13, 14, 15, 16, 16, 18, 19, 20, 44, 50, 50, 65, 70, 70, 87, 99] → L_1

Via 1-Var Stats:

$\min X = 10$; $Q_1 = 15.5$; $Med = 20$; $Q_3 = 67.5$; $\max X = 99$

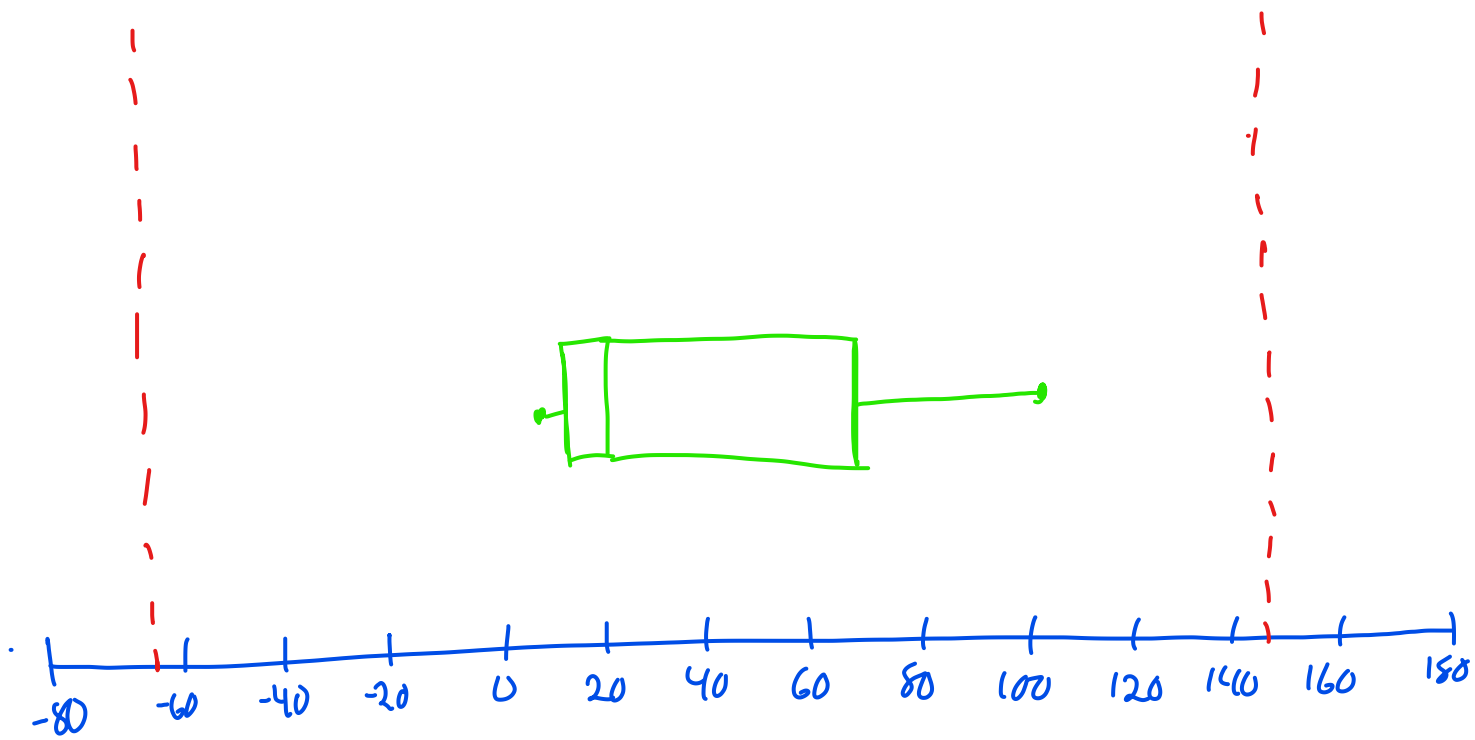
4. Now find the lower and upper fences from with the data from question 3.

$IQR = 67.5 - 15.5 = 52$

$\text{lower} = 15.5 - (1.5 \times 52) = -62.5$

$\text{upper} = 67.5 + (1.5 \times 52) = 145.5$

5. Draw the modified box plot detailed in question 3 and 4.


-80
-60
-40
-20
0
20
40
60
80
100
120
140
160
180