Describing Distributions with Numbers

Data Sets:

L1	7.4	9.1	5.4	6.8	6.9	9.3	9.1	8.2	7.3	6.7	9.4
L2	16	18	18	21	24						
L3	5.8	6.0	6.3	6.4	6.7	9.4					
L4	5.8	6.0	6.3	6.4	6.7	94					
L5	x_1	x_2	x_3	x_4	...	x_n					

1. Enter the first four data sets into your calculator by using the Statistics on the TI-83 handout. Note when attempting to clear data, if you hit **DEL** instead, not only is the information cleared, but you also loose L_1. If this ever happens by mistake you can reenter L_1 by highlighting L_2, hitting **2nd** and then the DEL button. Make sure you reenter the name by using the **2nd** and **1** buttons to finally get your L_1 back.

2. The worksheet will be investigating the objects defined below:

Mean	$\bar{x}$	of L5 $\dfrac{x_1 + x_2 + x_3 + ... + x_n}{n}$
Median	M	x_i so that if n is odd, x_i is below half the ordered observed values if n is even, x_i is the average of the middle two observations
First Quartile	Q_1	the median of the observations to the left of the location of M
Third Quartile	Q_3	the median of the observations to the right of the location of M
Standard Deviation	S or σ	$\sqrt{\dfrac{(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + ... + (x_2 - \bar{x})^2}{n-1}}$

3. To fill in the following table you are welcome to either perform the computations using the definitions above or use your calculator following the calculator guide handed out on the first day. Make sure that you can use either to answer future questions. Note, the last 5 numbers in the table below are commonly referred to as the *Five-number Summary* and your calculator uses S to denote the standard deviation of a data set, *not* σ.

	$\bar{x}$	S	Minimum	Q_1	M	Q_3	Maximum
L1							
L2							
L3							
L4							

4. Encode some of the above information by creating a box plot for L1 and L3 (an example of one is on page 44 of your text) along with their histograms. Again, you are welcome to either do this from the definition or by using your calculator but be prepared to do either in the future. Please draw these on a separate piece of paper.

5. Notice that L3 and L4 differ by only one number. What effect does this difference have on M and on $\bar{x}$?

6. Brainstorm in your group to come up with strengths and weaknesses for both M and $\bar{x}$. Record your results below and consider consulting the text or me.

7. Read and answer question 2.1 found on page 39. Come up with a description of data that would probably result in the mean being larger then the median (as opposed to being smaller as in 2.1).

8. Work together to come up with an answer for 2.3 on page 41.

9. Would you rather call M or $\bar{x}$ the center of the associated histograms? Why?