

10.7 Data Displays

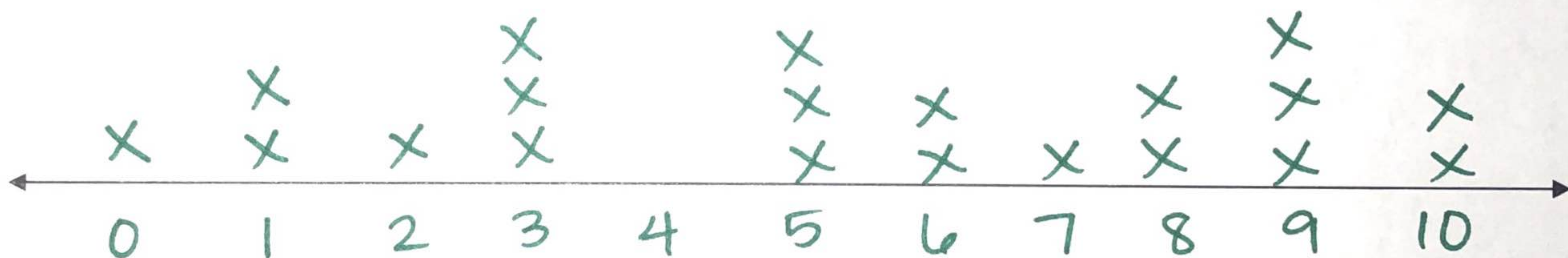
Organizing data can help us see patterns.

line plot - uses a number line with X's to show how often a value occurs in a data set

Ex 1: Use a Line Plot to organize the data.

Number of miles run, walked, or biked

7	5	6	5	5	10	9	9	9	3
3	10	1	0	8	6	8	2	3	1



mean - the sum of the data values divided by the number of data items, a measure of center (AKA average)

median - middle value of data items arranged in order (if there is an even number of items, find the mean of the two middle values)

mode - value(s) that occur most often

range - difference between greatest and least values in a data set

outlier - data values that are WAY out there

Ex 2: Find the mean, median, mode, and range of the data set:

2, 1, 8, 0, 2, 4, 3, 4 \rightarrow 0, 1, 2, 2, 3, 4, 4, 8

$$\text{mean} = \frac{0+1+2+2+3+4+4+8}{8}$$

$$\text{mean} = \frac{24}{8}$$

$$\text{mean} = 3$$

$$\text{median} = \frac{2+3}{2}$$

$$\text{median} = \frac{5}{2}$$

$$\text{median} = 2.5$$

$$\text{mode} = 2 \text{ and } 4$$

$$\text{range} = \text{max} - \text{min}$$

$$\text{range} = 8 - 0$$

$$\text{range} = 8$$

minimum - least value

maximum - greatest value

lower quartile (LQ) - median of lower half of data

upper quartile (UQ) - median of upper half of data

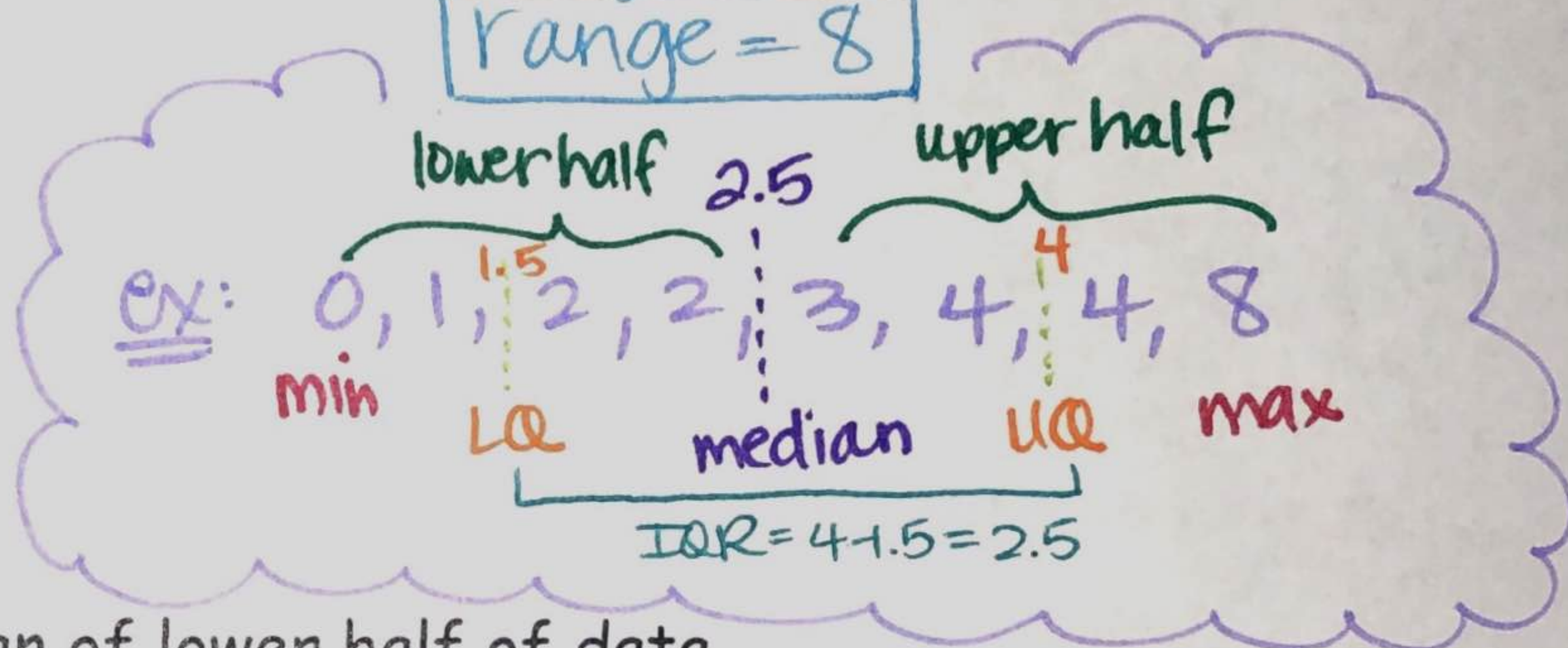
interquartile range (IQR) - the difference between the upper quartile and the lower quartile, $\text{IQR} = \text{UQ} - \text{LQ}$

mean absolute deviation (MAD) - the average of the differences between each data set and the mean

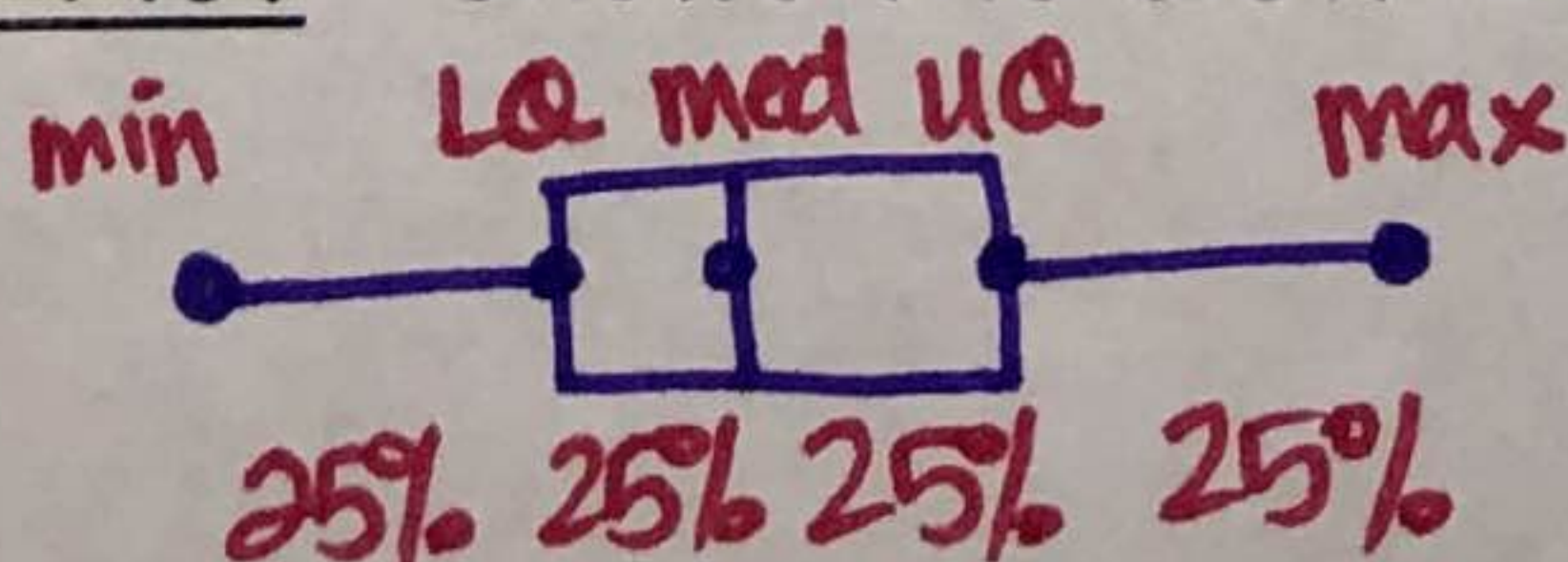
Step 1: Find mean

Step 2: Find the difference between each data set and the mean in Step 1

Step 3: Find the average of these differences (add them and divide by the number of data values)

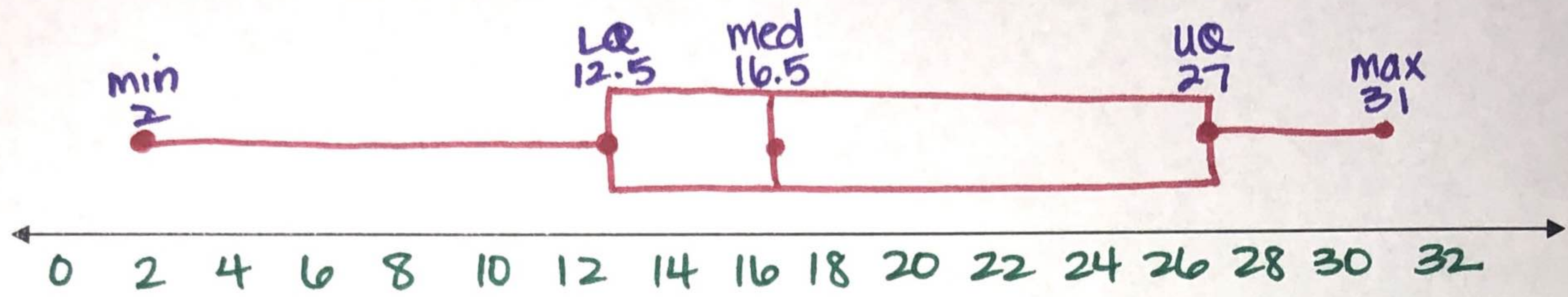


Box-and-Whisker Plot - shows the distribution of data using all of the above information



Ex 3: Let's make a box-and-whisker plot to represent the data of our class for everyone's birthdate number: 16, 29, 2, 17, 21, 30, 31, 8, 15, 13, 2, 29, 19, 14, 26, 3, 15, 28, 20, 1

in order: 2, 2, 3, 8, 12, 13, 14, 15, 15, 16, 17, 19, 20, 21, 26, 28, 29, 29, 30, 31
 min 12.5 LQ 16.5 med 27 UQ max



Minimum 2
 Maximum 31
 Median 16.5

Lower quartile 12.5
 Upper quartile 27
 Range 31 - 2 = 29
 IQR 27 - 12.5 = 14.5

Ex 4: Find the MAD for number of pets the students in the front row own:

2, 2, 3, 2, 5, 7, 1

Step 1:
 mean

$$\text{mean} = \frac{2+2+3+2+5+7+1}{7}$$

$$= \frac{22}{7}$$

$$\approx 3.14$$

Step 2:

difference b/w
 every # and mean

$$\begin{aligned} 3.14 - 2 &= 1.14 \\ 3.14 - 2 &= 1.14 \\ 3.14 - 3 &= 0.14 \\ 3.14 - 2 &= 1.14 \\ 5 - 3.14 &= 1.86 \\ 7 - 3.14 &= 3.86 \\ 3.14 - 1 &= 2.14 \end{aligned}$$

Step 3:

average

$$\text{MAD} = \frac{3(1.14) + 0.14 + 1.86 + 3.86 + 2.14}{7}$$

$$\text{MAD} = \frac{11.42}{7}$$

MAD ≈ 1.63