Quantitative Data

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In order to represent quantitative data, we can use a frequency table just as we could for qualitative data.

Example 1.1. The results for a math quiz are given below.

7.5	7	9.5	9	10	9	7.5	5	9.5
10	9.5	9	7	7.5	10	8	7.5	9

Construct a frequency table for the data above, then construct a bar graph from the frequency table.

Question 1.2 What are some graphical concerns with the bar graph from the previous example? What are some ways we could improve the graph?

Definition 1.3 (Histogram)

A **histogram** is a graphical representation of numerical data that is similar to a bar graph, but uses a number line as the horizontal axis.

Example 1.4. Create the histogram for the previous example.

With quantitative data, often we have to work with large input ranges. We can handle large ranges by using **class intervals**.

Definition 1.5 (Class Intervals)

Class intervals are groupings of input data used to make histograms are easier to read

Class Interval Rules

When creating class intervals, we have several rules.

- Each piece of data must fall into one of the classes
- Classes must not overlap
- Classes must be of equal width
- There must be no gaps between classes, even if a class has no data

Example 1.6. The height (in inches) of the members of a high school basketball team are collected in the table below:

65	70	68	72	71
70	77	72	69	71

(a) Create four class intervals using the data.

(b) Create the relative frequency distribution for the class intervals.

(c) Use part (b) to create the histogram for the data.

Example 1.7. Get into groups (your instructor will tell you the size).

(a) Within your group, figure out how many countries each person has been to.

(b) Your instructor will gather the information from each group and write it down for the class. With your group, create the histogram for the data.

Example 1.8. The following table presents the number of hours worked last week by employees at a local drug store.

52	18	2	20	9	9	11	6
4	12	9	16	10	37	15	18
4	3	17	19	12	20	11	14
21	36	17	3	23	28	19	20

Create the hisogram by breaking the data into 5 classes.

Data can also be visualized by using another kind of graphic, called a **stem-and-leaf plot**.

Definition 1.9 (Stem-and-Leaf Plot)

A **stem-and-leaf plot** is a graphic which separates numerical data into two pieces: the **stem** (such as the left-most digits) and the **leaf** (such as the right-most digit).

Example 1.10. Create the stem-and-leaf plot for the previous example. Here's the data again:

The following table presents the number of hours worked last week by employees at a local drug store.

52	18	2	20	9	9	11	6
4	12	9	16	10	37	15	18
4	3	17	19	12	20	11	14
21	36	17	3	23	28	19	20

Example 1.11. A Spotify playlist purports to collect the 50 top songs of the week. For the week of July 25 - July 29, the BPM (beats per minute) of those top 50 songs were collected and are listed below.

101	140	109	174	160	107	107	141	109	107
132	169	103	142	126	147	154	166	115	103
81	115	156	102	129	102	108	165	170	78
122	95	170	84	112	186	118	180	125	176
94	120	135	113	101	93	158	117	81	161

(a) Create a histogram for the data by dividing into classes of your choosing.

(b) Create a stem-and-leaf plot for the data.

(c) Which graphical representation (if either) do you think best displays the data? What do you think makes it better than the other? Or, why do you think both representations are good representations?