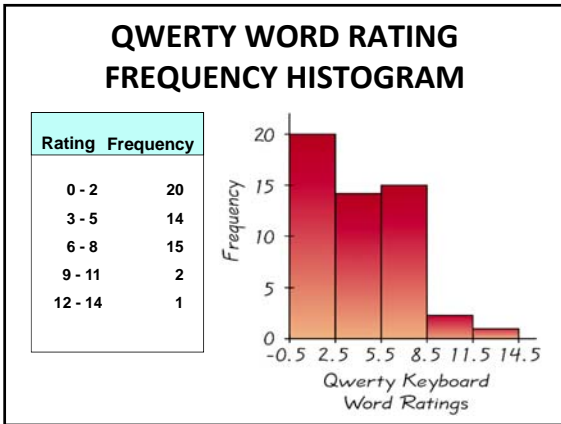
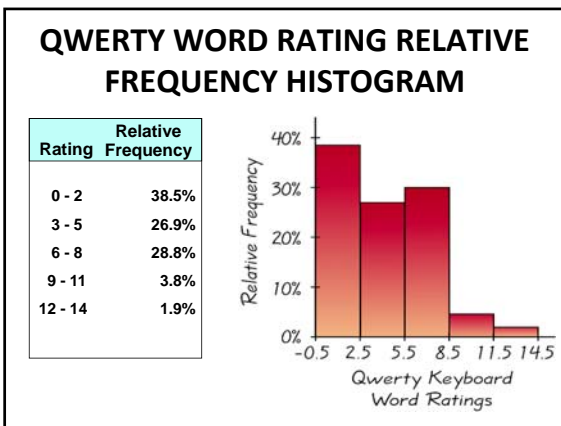


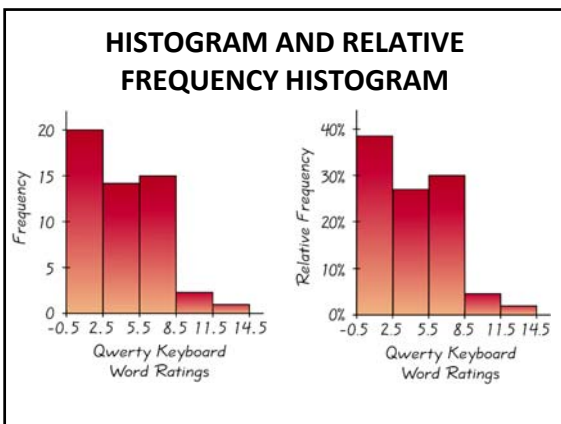
Section 2-2
Histograms

VISUALIZING DATA
In this section, we will learn how to visualize data with a histogram. The goal is not simply to construct the graphs – but rather to learn something about the data and understand the nature of their distributions.

HISTOGRAMS
A **histogram** is a graph consisting of bars of equal width drawn adjacent to each other (unless there are gaps in the data). The horizontal scale represents classes of quantitative data values and the vertical scale represents frequencies. The heights of the bars correspond to the frequency values.







DRAWING A FREQUENCY HISTOGRAM FROM RAW DATA ON THE TI-83/84

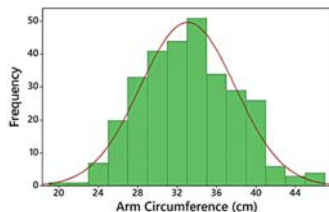
1. Press **STAT**; select **1:Edit...**
2. Enter your data values in **L1**. (Note: You could enter them in a different list.)
3. Press **WINDOW**. Set **Xmin** to the lower class boundary of the first class; set **Xmax** to the upper class boundary of the last class; and set **Xscl** to the class width. (Note: You may need to set **Ymin** and **Ymax** to see the histogram.)
4. Press **2ND, Y=** (for **STATPLOT**). Select **1:Plot1**.
5. Turn the plot **ON**. For **Type**, select the histogram (last one on first row).
6. For **Xlist**, enter L1 by pressing **2ND, 1**.
7. For **Freq**, enter the number 1.
8. Press **GRAPH**.

DRAWING A FREQUENCY HISTOGRAM FROM A FREQUENCY DISTRIBUTION ON THE TI-83/84

1. Compute the midpoint of each class.
2. Press **STAT**; select **1:Edit...**
3. Enter the midpoints in **L1** and the frequency for the class in **L2**.
4. Press **WINDOW**. Set **Xmin** to the lower class boundary of the first class; set **Xmax** to the upper class boundary of the last class; and set **Xscl** to the class width. (Note: You may need to set **Ymin** and **Ymax** to see the histogram.)
5. Press **2ND, Y=** (for **STATPLOT**). Select **1:Plot1**.
6. Turn the plot **ON**. For **Type**, select the histogram (last one on first row).
7. For **Xlist**, enter L1 by pressing **2ND, 1**.
8. For **Freq**, enter L2 by pressing **2ND, 2**.
9. Press **GRAPH**.

CRITICALLY THINKING: INTERPRETING HISTOGRAMS

One key characteristic of a normal distribution is that it has a “bell” shape. The histogram below illustrates this.



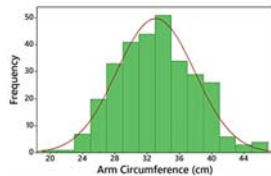
COMMON DISTRIBUTION SHAPES

In addition to the bell-shaped (normal distribution), there are some other common distribution shapes:

- Normal (bell-shaped)
- Uniform
- Skewed to the right
- Skewed to the left

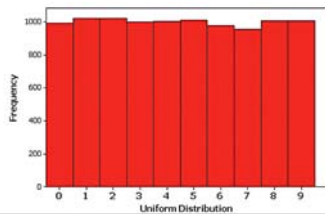
BELL-SHAPED (NORMAL) DISTRIBUTION

In a bell-shaped (normal) distribution, (1) the frequencies increase to a maximum and then decrease, and (2) the graph has symmetry, with the left half of the histogram being roughly a mirror image of the right half.



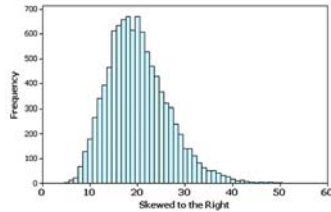
UNIFORM DISTRIBUTION

With a [uniform distribution](#), the different possible values occur with approximately the same frequency, so the heights of the bars on the histogram are approximately uniform.



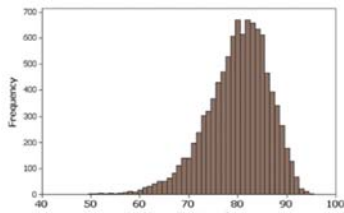
SKEWED TO THE RIGHT

Data skewed to the right (also called positively skewed) have a long right tail.



SKEWED TO THE LEFT

Data skewed to the left (also called negatively skewed) have a long left tail.



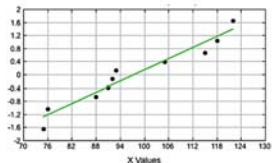
ASSESSING NORMALITY WITH NORMAL QUANTILE PLOTS

Criteria for Assessing Normality with a Normal Quartile Plot:

- **Normal Distribution:** The pattern of the points in the normal quantile plot is reasonably close to a straight line, and the points do not show some systematic pattern that is not a straight-line pattern.
- **Not a Normal Distribution:** The population distribution is *not* normal if the normal quantile plot has either or both of these two conditions:
 - The points do not lie reasonably close to a straight-line pattern.
 - The points show some systematic pattern that is not a straight-line pattern.

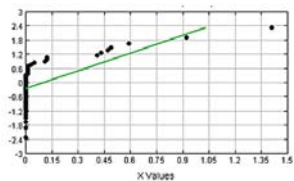
NORMAL DISTRIBUTION

The points are reasonably close to a straight-line pattern, and there is no other systematic pattern that is not a straight-line pattern.



NOT A NORMAL DISTRIBUTION

The points do not lie reasonably close to a straight line.



NOT A NORMAL DISTRIBUTION

The points show a systematic pattern that is not a straight-line pattern.

