Section 2.2 Bar Graphs, Circle Graphs, and Time-Series Graphs

Objective: In this lesson you learned how to determine appropriate graphs based on data, construct graphs, and interpret information displayed in graphs.

Important Vocabulary

Pareto Chart | Circle Graph | Time-Series Graph

Time-Series Data

Focus Points:

- Determine types of graphs appropriate for specific data
- Construct bar graphs Pareto charts, circle graphs, and time-series graphs
- Interpret information displayed in graphs

I. Bar Graphs

Histograms are a useful visual display for the distribution of data.

However, the data must be quantitative.

Bar graphs can be used to display quantitative or qualitative.

Features of a bar graph

1. Bars can be vertical or horizontal
2. Bars are of uniform width and uniformly spaced.
3. The lengths of bars represent values of the variable being displayed, the frequency of occurrence, or percentage of occurrence.
4. The graph is well annotated with title, labels for each bar, and vertical scale or actual value for the length of each bar.

Changing Scale: Whenever you use a change in scale in a graphic, warn the viewer by using a squiggle ~ on the changed axis.

II. Pareto Charts

A Pareto chart: a bar graph where the bar height represents frequency of an event.

NOTE: arranged left to right according to decreasing height

III. Circle Graphs

In a circle graph: (pie chart) wedges of a circle visually display proportional parts of the total population that share a common characteristic

IV. Time-Series Graphs

In a time-series graph: data are plotted in order of occurrence at regular intervals over a period of time

Time-series data: consist of measurements of the same variable for the same subject taken at regular intervals over a period of time

How to decide which type of graph to use:

1. Bar Graphs – useful for quantitative or qualitative
2. Pareto Charts – identify frequency of events or categories in decreasing order.
3. Circle Graphs – display how a total is dispersed into several categories
4. Time-series Graphs – display how data change over time
5. For any graph – provide a title, label the axes, and identify units of measure.

What do graphs tell us?

- How data are distributed over several categories or data intervals
- How data from two or more data sets compare.
- How data change over time.

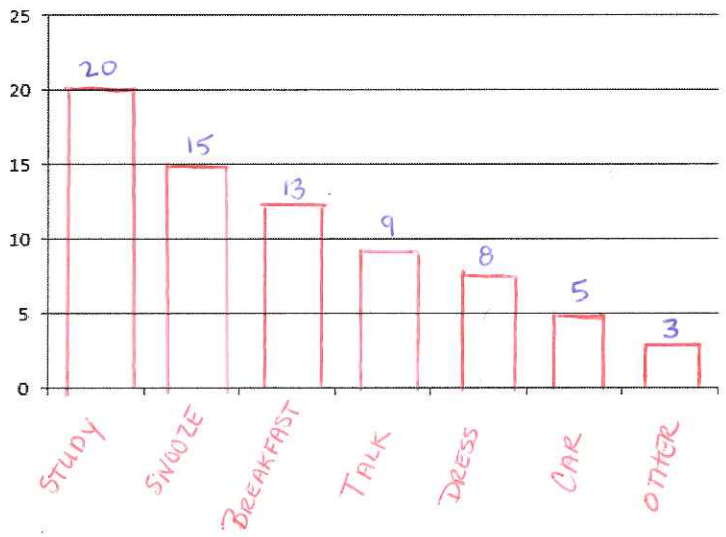
Section 2.2 Examples – Bar Graphs, Circle Graphs, and Time-Series Graphs

(1) Suppose you want to arrive at college 15 minutes before your first class so that you can feel relaxed when you walk into class. An early arrival time also allows room for unexpected delays. However, you always find yourself arriving "just in time" or slightly late. What causes you to be late? Charlotte made a list of possible causes and then kept a checklist for 2 months (table above). On some days more than one item was checked because several events occurred that caused her to be late.

Causes for Lateness (September - October)

Cause	Frequency
Snoozing after alarm goes off	15
Car trouble	5
Too long over breakfast	13
Last-minute studying	20
Finding something to wear	8
Talking too long with roommate	9
Other	3

a. Make a Pareto chart showing the causes for lateness. Be sure to label the causes, and draw the bars using the same vertical scale.



b. Looking at the Pareto chart, what recommendations do you have for Charlotte?

- Rearrange study time
- get up earlier to study

(2) How long do we spend talking on the telephone after hours (at home after 5 P.M.)? The results from a recent survey of 500 people (as reported in *USA Today*) are shown in the table below. Make a circle graph to display these data.

Time Spent on Home Telephone after 5 P.M.

Time	Number	Fractional Part	Percentage	Number of Degrees
Less than 0.5 hour	296	296/500	59.2	59.2% × 360° ≈ 213°
0.5 hour to 1 hour	83	83/500	16.6	16.6% × 360° ≈ 60°
More than 1 hour	121	121/500	24.2	24.2% × 360 ≈ 87°
Total	500		100%	360°

a. Fill in the missing parts in the table (above) for "More than 1 hour." Remember that the central angle of a circle is 360°. Round to the nearest degree.

b. Fill in the totals. What is the total number of responses? Do the percentages total 100% (within rounding error)? Do the number of degrees total 360° (within rounding error)?

c. Draw a circle graph. Divide the circle into pieces with the designated numbers of degrees. Label each piece, and show the percentage corresponding to each piece.