This section is about how to organize a **data set** in a way that accurately represents the data.

Just looking at Table 9.1 can give us some idea of how the class did.

We can make a **dot plot** of the data, by placing a dot above the number line for each score. Then, we can visually see groupings of data, estimate a "typical" score, or determine **outliers**. Dot plots are good for summarizing relatively small sets of data.
♦ How many people scored a 79? (4)

To make a **stem and leaf plot** for Table 9.1, we let the tens digits of the scores be the stems and let the units digits be the leaves. Stem and leaf plots serve the same purpose as dot plots in giving a visual representation. They are especially useful in comparing small data sets.
♦ What was the lowest score for section 2? (43)

For a **histogram**, we group our scores into intervals, and the number of scores in each interval (**the frequency of the interval**) is indicated by the height of the rectangle above that interval. **Frequency** is the number of times any particular data value occurs. Histograms are good for summarizing information from large sets of data, especially data which is easily grouped into intervals. The sum of all the heights of the rectangles gives the total number of data values. Disadvantages are that you cannot see the frequency of a particular value, and you must be careful of how you group the data.
♦ What happens if you have too few intervals? (You lose the advantage of creating the diagram.)

One way to construct a **line graph** is to connect the midpoints of the tops of the rectangles with line segments. Line graphs are useful for representing data that varies continuously, such as summarizing trends over time.
♦ Can we estimate expenditures in 1972? ($\approx$ \$140 billion)

Bar graphs are like histograms, but instead describe categorical data. The height of the bar is still the frequency of that category, but the bars typically do not touch. You can even use bar graphs to compare data from more than one data set.
♦ How can we draw a bar graph for Sections 1 and 2? (See graphs)

We make **pie charts** to represent relative amounts of a whole. You must determine how big each piece must be of the 360° that make up the circle. Note that if the graph is drawn in perspective, or the pieces are separated for visual effect, the central angles may not be completely accurate.

Example 9.3: How big should the central angle be for each sector in the pie chart representing sales of lottery tickets given that the sales were comprised of: Instant - \$18.5b, 3-digit - \$5.3b, 4-digit - \$2.9b, Lotto - \$9.6b, Other - 5.6b.

Pictographs can summarize relative amounts, trends and data sets. They are useful in comparing quantities. To create a pictograph, you need to pick a small icon/figure (usually related to the data), and decide how many units that icon represents (the **key**). Similar to a histogram, the key must be chosen so that the resulting pictograph shows enough detail without being too busy.
♦ How many real Christmas trees were sold in 2003? ($\approx$ 24m)

When creating graphs, one needs to take care to accurately represent the data. It is sometimes possible to distort the graph to mislead the viewer.
♦ By doubling the dimensions of the barrel, how much did the volume increase by? (8 times)

Section 9.1 HW: #2,8a,9,16,18,26,34 (part of HW2)

Note: % change = $\frac{\text{new - old}}{\text{old}}$