Main Ideas

- Calculate Mean, Median, Mode
- Demonstrate understanding of Mean, Median, Mode
- Determine the most appropriate measure of center
Section 4.1
Measures of Location

Learning Objectives
- Calculate the mean, median, and mode
- Demonstrate understanding of the concept of mean, median, and mode
- Determine the most appropriate measure of center
- Measure of center
- The average of all data points
  - Add each data point and divide by the total number of observations
- Can be heavily affected by outliers
  - An outlier is a data value that is extremely different from the other measurements
  - Mean may not be the best measure of center if we have an outlier(s)

\[
\text{AVERAGE(select\_data)}
\]

\[
\text{What's Average?}
\]

- Measure of center
- Middle value of data
- Half the observations are below the median, half are above
- Arrange data in ascending order to find data value in the middle
  - Odd number of observations: Take data value exactly in the middle
  - Even number of observations: Take the mean of the two middle observations
- Not affected by outliers

\[
\text{MEDIAN(select\_data)}
\]

\[
6 \text{ IS THE MEDIAN}
\]
Most frequently occurring value
Not affected by outliers

- **Bimodal**: Two mode
- **Multimodal**: More than two modes
- **No mode**: All observations occur with same frequency

**MODE(select_data)**

If there is no mode, Excel will output "# N/A".
The creative director for an advertising agency is trying to target an ad campaign that will be shown in one city by analyzing family income.

A telephone company is interested in knowing how customers rate their service: excellent, good, average, or poor.

A young economist is comparing the interest rates on certificates of deposit (CDs) for three banks in different cities.

The relationship between mean, median, and mode (typically)

- Negatively Skewed: Skewed left, mean is smaller than the median, mode is greater than the median, mean < median < mode.
- Normal Distribution: Bell-shaped, mean, median, and mode are identical.
- Positively Skewed: Skewed right, mean is greater than the median, mode is smaller than the median, mean > median > mode.
Slide 7

**Situation A**
The best measure of center would be **median** as we want to know the middle income but the average could be skewed by 1 or 2 really rich people.

**Situation B**
Mode is the best measure as knowing the rating customers gave most often is the most informative.

**Situation C**
Mean is the best because interest rates should all be similar so the Mean won't be skewed by an outlier, and the average interest rate would be helpful to determine where to invest your money.
Wrap Up

- Homework Due Next Wednesday
- Use Excel to complete your homework!!!!
  - Select "Copy Data" in Hawkes.
  - Paste the data into Excel.
  - Use Excel formulas to find mean, median, and mode.