Read: Sections 1 through 5 pp 92-149

Work the following text examples:
Section 3.2, 3-1 through 3-17
Section 3.3
Section 3.4
Section 3.5

Examples to be worked in class:
3.2 Exercise 6, 14, 28 p. 107-109
3.3 Exercise
3.4 Exercise
3.5 Exercise

Homework: Exercises 1-21 odd,

Critical Thinking:
3.2 Measures of Central Tendency

- The Mean
  - (defined) -
Mean for Grouped Data

Example: Automobile Fuel Efficiency in M.P.G. (Exercise 3-14 p. 107)

- Step 1: Make a Table

<table>
<thead>
<tr>
<th>Class</th>
<th>Frequency</th>
<th>Midpoint</th>
<th>( f \times X_m )</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.5 - 12.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.5 - 17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.5 - 22.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.5 - 27.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.5 - 32.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Step 2:

- Step 3:

- Step 4:
• Step 5:

The Median

Case 1: Finding the median when $n$ is odd.
Exercise 3-4 p. 107. The number of hospitals for the five largest hospital systems.

340, 75, 12, 259, 151

• Step 1:

• Step 2:

Case 2: Finding the median when $n$ is even.
Example: English composition scores for 18 students. (Exercise 3-6 p. 107)

• Step 1: Sort the data.

59, 62, 63, 73, 78, 78, 79, 81, 82, 84, 86, 87, 88, 90, 93, 93, 97, 98

• Step 2:
The Mode

mode (defined) -

Examples

Hypothetical datset

12, 12, 13, 13, 14, 14, 14, 14, 20, 23, 23, 45

Exercise 3-6 p. 107

59, 62, 63, 73, 78, 78, 79, 81, 82, 84, 86, 87, 88, 90, 93, 93, 97, 98

Exercise 3-4 p. 107

75, 123, 151, 259, 340

Hypothetical dataset

1, 1, 2, 2, 3, 3, 4, 4

Hypothetical dataset

1, 1, 2, 2, 3, 3, 4

Note: The mode is the only statistic used to measure central tendency (a.k.a. a typical case) for nominal or categorical data. See example 3-13 in the text (p. 101).

The Midrange

- Defined as

\[
\text{midrange} = \]

-
The Weighted Mean

- Weighted mean formula is given by

\[
\text{Weighted mean} = \frac{\sum_{i=1}^{n} w_i X_i}{\sum_{i=1}^{n} w_i}
\]

Example - 3-28 p. 109

<table>
<thead>
<tr>
<th>Area</th>
<th>% Favored (X)</th>
<th>Number Surveyed (w)</th>
<th>( w \times X )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>30</td>
<td>3000</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>50</td>
<td>800</td>
<td></td>
</tr>
<tr>
<td>Sums</td>
<td></td>
<td>4800</td>
<td></td>
</tr>
</tbody>
</table>

Thus we have that

\[
\text{Weighted mean} = \frac{170000}{4800} = 35.42\%
\]

Compare with

\[
\text{Mean} = \frac{\sum_{i=1}^{n} X_i}{n} = \frac{120}{3} = 40\%
\]

Good test question. Explain why the Weighted Mean is lower than the Mean (in the example above).
Distribution Shapes

- There are three main distributional shapes.
- Shape 1 -
- Shape 2 -
- Shape 3 -

Examples

Final Note: The green colored box is a nice summary of these measures. Exercise 3.32 p. 109 is a nice way to test your understanding. Test preparation means understanding calculations plus properties.