8.4 - Down for the Count

23. Since the order of the selections doesn't matter:

\[
\frac{200 \times 199 \times 198 \times 197}{4 \times 3 \times 2 \times 1} = \frac{1,552,438,800}{24} = 64,684,950
\]

32. Ways to pick 3 bills if order doesn't matter:

\[
\frac{10 \times 9 \times 8}{3 \times 2 \times 1} = 120 \text{ ways} \rightarrow \text{only one of these ways includes the selection of all 3 counterfeit bills}
\]

Probability:

\[
\frac{1}{120} = 0.83\%
\]

9.2 - Getting Your Data to Shape Up

The distribution is clearly centered in the 25-29 range; more people paid less than this than more, but there is also one outlier on the high side, which skews the graph slightly.
2. Mean: \[ \frac{\text{sum of data}}{22} = \frac{575}{22} = 26.14 \]

Median: 25

Median gives a better answer to the question, since the mean is distorted by the outlier while the median is unaffected.

3. Minimum: 14
   First Quartile: 19
   Second Quartile (Median): 25
   Third Quartile: 26
   Maximum: 58

Yes, it gives a similar impression, showing that there are a lot of values in the same range above the median, but the values are more spread out below it.

6. a) McGwire's Home-run Totals per Season ('87 - '01)

- Number of Seasons
- Homerun Totals

- Homerun Totals

b) Bonds' Home-run Totals per Season ('87 - '07)

- Number of Seasons
- Homerun Totals
When comparing the first two graphs, McGwire has a more equally distributed number of home-runs with a larger standard deviation. When comparing the first and last graph, the Bonds graph looks more equally distributed, following a kind of bell curve, and seems to have a similar average.

13. For question 19:
   
   Data: 4, 5, 5, 5, 5, 5, 6, 6, 6, 6, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 8, 8, 8, 8

   Minimum: 4
   First Quartile: 6
   Second Quartile (Median): 7
   Third Quartile: 7
   Maximum: 8

   Five-number summary shows that the data has a small standard deviation with all of the numbers close to the median and no drastic outliers.
16. 2) Students' Weight

Number of People

<table>
<thead>
<tr>
<th>Weight (lbs)</th>
<th>90-119</th>
<th>120-149</th>
<th>150-179</th>
<th>180+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of People</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

Mean: 133.5 lbs (using middle value of range)
Median: 130 lbs

16. 8) Number of Dates Students go on Per Month

Number of Dates

<table>
<thead>
<tr>
<th>Number of Dates</th>
<th>0-1</th>
<th>2-3</th>
<th>4-5</th>
<th>6-7</th>
<th>8+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of People</td>
<td>13</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Mean: 2.3 (using middle value of range)
Median: 1.5
These graphs show that students are generally "equally distributed", resulting in a centred graph, with an exception being the skewed graph for number of dates per month; graphs also generally have a small standard deviation.