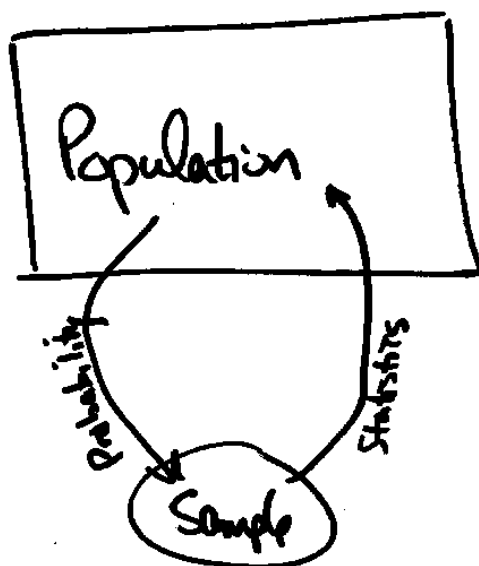


Probability & Statistics

243

①

9-26



Descriptive Statistics

②

55
75
36
66
65
66
71
79
81

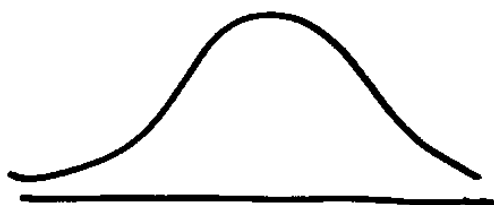
Stem-and-leaf plot

3	6
4	
5	5
6	656
7	519
8	1

↑ stems ↑ leaves

3	6
4	
5	5
6	566
7	159
8	1

③



Symmetric



Skewed to the left



Skewed to the right

④

Numerical Summaries

Measures of Location

$$\text{Sample mean} = \bar{x} = \frac{\sum x}{n} = 66$$

$$\begin{aligned}\text{Sample mode} &= \text{most frequent observation} \\ &= 66\end{aligned}$$

$$\begin{aligned}\text{Sample median} &= \text{"middle" observation} \\ &= Q_2 = 66\end{aligned}$$

To find the median:

⑤

① $i = \text{index} = (n+1)(.5)$

② If i is a whole number, select that observation

If i is not a whole number, then
average the 2 adjacent observations

In our data set, $i = (9+1)(.5) = 5$

So Q_2 is the 5th observation

$$Q_2 = 66$$

⑥

Percentiles and quartiles

To find the p^{th} percentile,

① $i = (n+1) \cdot \frac{p}{100}$

② If i is a whole number, select that observation

If i is not a whole number, then

say $i = w.f$

The percentile is the w^{th} observation
+ $f((w+1)^{\text{th}} - w^{\text{th}})$

In our data set, find the 25th percentile.

⑦

$$\textcircled{1} i = (9+1) \frac{25}{100} = 2.5$$

$$\begin{aligned} \textcircled{2} \quad & \begin{array}{l} 2^{\text{nd}} \text{ obs: } 55 \\ 3^{\text{rd}} \text{ obs: } 65 \end{array} \quad \begin{array}{l} 55 + .5(65 - 55) \\ = 55 + .5(10) \\ = 55 + 5 = 60 = Q_1 \end{array} \end{aligned}$$

Find the 75th percentile

$$\textcircled{1} i = (9+1) \frac{75}{100} = 7.5$$

$$\begin{aligned} \textcircled{2} \quad & \begin{array}{l} 7^{\text{th}}: 75 \\ 8^{\text{th}}: 79 \end{array} \quad \begin{array}{l} 75 + .5(79 - 75) \\ = 75 + .5(4) = 77 = Q_3 \end{array} \end{aligned}$$

⑧

Suppose $n = 25$

Find the location of the 85th percentile

$$\textcircled{1} i = (25+1) \frac{85}{100} = 22.1$$

$$\begin{aligned} \textcircled{2} \quad & \begin{array}{l} 22^{\text{nd}}: a \\ 23^{\text{rd}}: b \end{array} \quad a + .1(b - a) \end{aligned}$$

Read Chapter 1, Secs 1, 2, 3

p.31 #17 p.34 #23