Section 2.3

Part II

Summarizing Data Using Averages

Adult Female Heights (cm)

SORTED

x	
148.0	1
152.2	2
152.7	3
155.1	4
155.2	5
155.5	6
156.2	7
156.8	8
156.9	9
157.9	10
158.0	11
158.3	12
158.4	13
158.6	14
159.8	⑮
159.8	⑯
159.9	
160.2	
160.9	
162.3	
162.4	
164.0	
164.2	
166.9	
167.2	
167.6	
170.4	
175.9	
176.4	
184.1	

$n=30$

Median Positions:

$\frac{n}{2}=15$

$\frac{n}{2}+1=16$

Values in Positions 15 & 16 are 159.8 & 159.8. The median is the mean of these.

$\tilde{x}=\frac{159.8+159.8}{2}$

$\tilde{x}=159.8$

Trimmed Mean: If a sample distribution is skewed, a trimmed mean can give a better estimate of the population mean. We remove a few of the smallest & largest (the same number of each) values.

If we remove the smallest & largest height the total is 4509.7, from 28 values.

$$\text{Trimmed mean} = \frac{4509.7}{28} \approx 161.06$$

Mode: most frequent value in the data set.

mode = 159.8 cm.

Midrange: $\frac{\text{min}+\text{max}}{2} = \frac{148.0+184.1}{2}$

↑ easily influenced by outliers.

$= 166.05$ cm

Median: A central value of a sorted list. Let n = sample size.

- If n is odd then the median is in position $\frac{n+1}{2}$.

Ex: $\{\underset{1}{1.3}, \underset{2}{2.7}, \underset{3}{6.5}, \underset{4}{\boxed{7.3}}, \underset{5}{9.4}, \underset{6}{10.2}, \underset{7}{11.1}\}$

$n=7 \Rightarrow$ median position $= \frac{n+1}{2} = \frac{7+1}{2} = 4$.

median $= \tilde{x} = 7.3$.

- If n is even, then the median is the mean of the values in positions $n/2$ & $n/2+1$.

Ex: Women's heights. $\frac{n}{2}=15$, $n/2+1=16$.

Values: 159.8 & 159.8. $\tilde{x}=(159.8+159.8)/2$

$\tilde{x}=159.8$.