3.3

#132 At least $(1-\frac{1}{k^2})$ of the observations fall within k standard deviations of the mean.

a) $k=2$ $\quad 1-\frac{1}{k^2} = 1-\frac{1}{2^2} = 0.75$

$\bar{x} \pm 2s \rightarrow 85 \pm 2(16.1) = 85-2(16.1)$ and $85+2(16.1)$

52.8 to 117.2

$\bar{x}=85$

$s=16.1$

$n=30$

$\frac{29}{30}$ are w/in 2 sd of the mean

$=0.967$

b) $k=3 \rightarrow 1-\frac{1}{3^2} = 0.889$

$\bar{x} \pm 3s \rightarrow 85 \pm 3(16.1) \rightarrow 85-3(16.1)$ to $85+3(16.1)$

36.7 to 133.3

$\frac{29}{30}$ are w/in 3 sd of the mean

#140

$\bar{x} = 18.14$ mm $\quad s = 1.76$mm

Empirical rule: 68% of obs. fall w/in one sd of the mean

95% fall w/in two sd " "

99.7% fall w/in three sd " "

For roughly bell-shaped dist only!

1) $\bar{x} \pm s \rightarrow 18.14 \pm 1.76$

$18.14-1.76$ to $18.14+1.76$

16.38 to 19.90 mm

2) $\bar{x} \pm 2s \rightarrow 18.14 \pm 2(1.76)$

14.62 to 21.66 mm

3) $\bar{x} \pm 3s \rightarrow 18.14 \pm 3(1.76)$

12.86 to 23.42 mm

3.4) #171

Sort: 57, 66, 88, 96, 116, 147, 147, 154, 154, 175.

a) Quartile: $n=10 \rightarrow \frac{n+1}{2} = \frac{11}{2} = 5.5$

Median / Q2: $\frac{116+147}{2} = 131.5$

Q1: $n=5 \rightarrow \frac{6}{2} = 3$ $\quad Q1 = 88$

Q3: $\quad Q3 = 154$

b) $IQR = Q3 - Q1 = 154 - 88 = 66$

50% of data fall b/w Q1 and Q3

IQR is another measure of variability.

c) five-number summary

min - Q1 - Q2 - Q3 - max

57, 88, 131.5, 154, 175

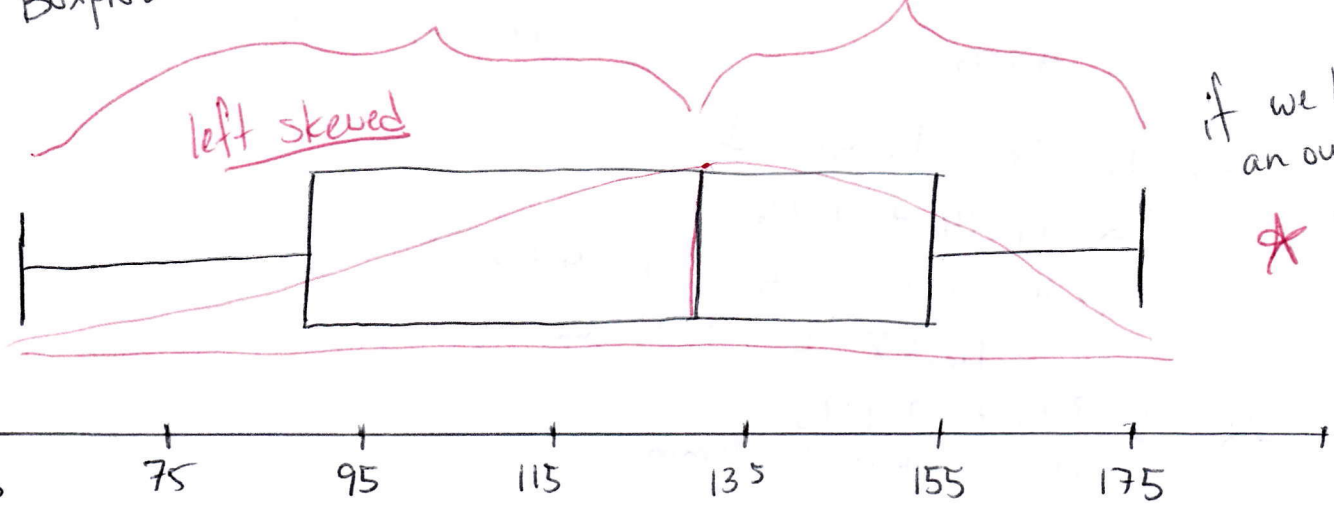
d) Outliers: upper and lower limits

lower: $Q1 - 1.5\,IQR = 88 - 1.5(66) = -11$

upper: $Q3 + 1.5\,IQR = 154 + 1.5(66) = 253$

No potential outliers!

e) Boxplot



adjacent pts: 57 and 175

3.225 (3.5)

Copperhead and tiger

$\mu_c = 812.07g$ $\sigma_c = 330.24g$ $Z = \frac{x-\mu}{\sigma}$

$\mu_t = 743.65g$ $\sigma_t = 336.36g$

Two snake with weight 850g

$$Z_c = \frac{850 - 812.07}{330.24} = 0.115$$

$$Z_t = \frac{850 - 743.65}{336.36} = 0.316$$

The tiger snake is the larger for its species.