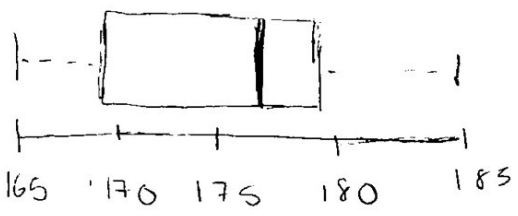
1)



min: 165

Q_1: 169.5

median: 176.0

Q_3: 179.5

max: 185.0

2) Mean($\bar{x}$) $= \frac{1}{n}\sum_{i=1}^{n} x_i =$ 175.2

Sample Variance $= \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x}) =$ 41.17

Sample Standard Dev $= s = \sqrt{v} =$ 6.42

Skewed left!

3) i) $\sum_{i=1}^{38} (x_i - 174)^2/38 = 10,884.73$ $t_i = (185-174)^2/38 = 15.7$

→ $P(T_1 + T_2) =$ 0.332

ii) $\sum_{i=1}^{38} (x_i - 175.2)^2/38 = 11,042.56$

↳ 1 - pchisq(15.17, 14) = 0.3668

iii) $T_3 = \frac{\bar{x} - \mu}{\sqrt{s^2/n}} = \frac{175.2 - 171}{\sqrt{6.42^2/15}} =$ 0.72

4) i) 0.89 → μ-interval for μ

mean = 175.2, 0.89, 172.37

$t = 105.75$, df = 14 → 172.66 – 179.74

ii) $\sigma = \sqrt{38} = 6.16$

$\mu = 175.2$, df = 14

$(1 - 0.89)/2 \to 0.055$

t-value: 1.75

172.5 – 177.7

lower = 172.5

~~upper~~ 177.7

175.2 − 2.7

175 + 2.7

4) cont (iii) $\frac{(n-1)s^2}{\chi^2_{\alpha/2}} < \sigma^2 < \frac{(n-1)s^2}{\chi^2_{1-\alpha/2}}$

$\frac{(15)38}{\chi^2\ 0.055,15} < \sigma^2 < \frac{(15)(38)}{\chi^2\ 0.945,15} \to$ $22.80 < \sigma^2 < 78.50$

5) Max likelihood → $f(x, \theta) = \begin{cases} \frac{1}{2\theta+1}, & 0 \le x < \theta \\ 0, & \text{otherwise} \end{cases}$

$L(\theta | x_1, \dots x_n) \to n \ln(2\theta+1)$

$\frac{d}{d\theta}[-n \ln(2\theta+1)] = \frac{-n}{2\theta+1} < 0$ maximum val of n

6) $\chi \sim G(p) \to E(x) = \frac{1}{p}$

$\frac{1}{p} = \frac{1}{n}\sum_{i=1}^{n} x_i \to \frac{1}{\hat{p}} = \bar{x}n$

$\hat{p} = \frac{1}{\bar{x}n}$

7) $X \sim N(-1, 3^2)$, $Y \sim N(1, 2^2)$ → (i) $2X + 3Y$ → anorm? NORMAL

$X_1 + Y_2 \sim N(\mu_1 + \mu_2, \sigma_1^2 + \sigma_2^2)$

$X_1 - Y_2 \sim N(\mu_1 - \mu_2, \sigma_1^2 + \sigma_2^2)$

$X \sim N(-1, 3^2)$ and $Y \sim N(1, 2^2)$

$X + Y \sim N(0, 13)$ $X - Y \sim N(-2, 13)$

Prob Dist of $2X + 3Y$? $2X \sim N(-2, 2.3^2)$

$3Y \sim N(3, 2.2^2)$

$2X + 3Y \sim N(0, 26)$ → normal w/ $\lambda = 1$, variance

(ii) $\left(\frac{(X+1)^2}{4}\right) / \left(\frac{(Y-1)^2}{4}\right)$ applying the formula