Statistics 300 **Summer 2007**
Quiz #4 **5:30-7:50 p.m.** **Name:** Solution

(5 points; 5 minutes)

1. **The heights of two professional basketball stars are compared. One is a woman who is 6 feet 2 inches tall. The other is a man who is 6 feet 10 inches tall. The population of all women who play basketball professionally has an average height (μ_w) of 5 feet 11 inches and a standard deviation (σ_w) of 2.5 inches. The population of all men who play basketball prefessionally has an average height (μ_m) of 6 feet 8 inches, with a standard deviation (σ_m) of 3.3 inches.**

   Relative to their professional peers, which athlete is taller?

Woman $x_w = 74$ inches $\mu_w = 71$ $\sigma_w = 2.5$

man $x_m = 82$ inches $\mu_m = 80$ $\sigma_m = 3.3$

$$Z_w = \frac{x_w - \mu_w}{\sigma_w} = \frac{74 - 71}{2.5} = 1.20$$

$$Z_m = \frac{x_m - \mu_m}{\sigma_m} = \frac{82 - 80}{3.3} = \frac{2}{3.3} = 0.61$$

Since $Z_w > Z_m$, the woman is taller relative to her peers than the man is relative to his peers.

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(8 points; 8 minutes)

2. **Based on the data set at the bottom of the page containing 80 values (8 rows of 10), answer the questions in part (a) and part (b).**

(a) What percentile is represented by the value 178 ? $178 = P_?$

$$? = k = \left(\frac{\#\text{ of values smaller than } 178}{\text{total \# of values}}\right)100$$

$$= \left(\frac{42}{80}\right)100 = (0.525)(100) = 52.5$$

$178 = P_{53}$ or $P_{52.5}$

(b) What is the value of the 44th percentile (P_{44}) ?

$$L = \left(\frac{44}{100}\right)80 = \left(\frac{k}{100}\right)N = 35.2 \uparrow 36^{th} \text{ position}$$

Value at position 36 = 166

$P_{44} = 166$

101	104	106	109	113	113	115	119	119	120
123	127	127	129	132	135	136	136	136	136
138	140	144	145	147	151	152	156	156	156
157	159	160	161	163	166	169	170	172	175
176	177	178	178	178	181	182	183	184	188
192	194	195	199	200	204	208	210	211	213
216	216	220	223	226	230	230	230	230	234
238	239	241	242	243	246	246	246	249	253

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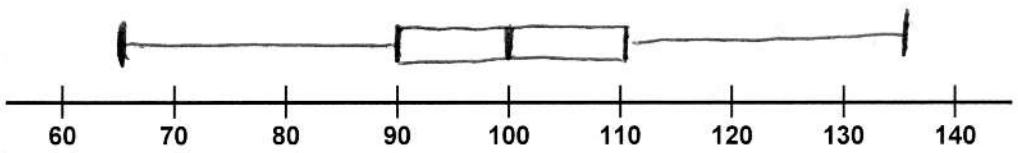
(6 points; 5 minutes)

3. **Based on the data set at the bottom of the page containing 101 values with the associated graph on the next page, construct an approximate boxplot to represent the data. Use the number line below to make your boxplot.**



Boxplots uses

minimum	Q_1	Q_2	Q_3	maximum
65.1	90.3	100.4	110.6	136.1

65.1	69.2	71.8	73.7	75.3	76.7	77.9	78.9	79.9	80.8
81.6	82.4	83.1	83.8	84.5	85.1	85.7	86.3	86.8	87.4
87.9	88.4	88.9	89.4	89.9	90.3	90.8	91.3	91.7	92.1
92.6	93.0	93.4	93.8	94.2	94.6	95.0	95.4	95.8	96.2
96.6	97.0	97.4	97.7	98.1	98.5	98.9	99.2	99.6	100.0
100.4	100.8	101.1	101.5	101.9	102.3	102.6	103.0	103.4	103.8
104.2	104.6	105.0	105.4	105.8	106.2	106.6	107.0	107.4	107.9
108.3	108.7	109.2	109.7	110.1	110.6	111.1	111.6	112.1	112.6
113.2	113.7	114.3	114.9	115.5	116.2	116.9	117.6	118.4	119.2
120.1	121.1	122.1	123.3	124.7	126.3	128.2	130.8	134.9	136.1
138.0									

Using formula

for $Q_1 = P_{25}$: $L = \left(\frac{25}{100}\right)101 = 25.25 \uparrow 26$

for $Q_2 = P_{50}$: $L = \left(\frac{50}{100}\right)101 = 50.5 \uparrow 51$

for $Q_3 = P_{75}$: $L = \left(\frac{75}{100}\right)101 = 75.75 \uparrow 76$

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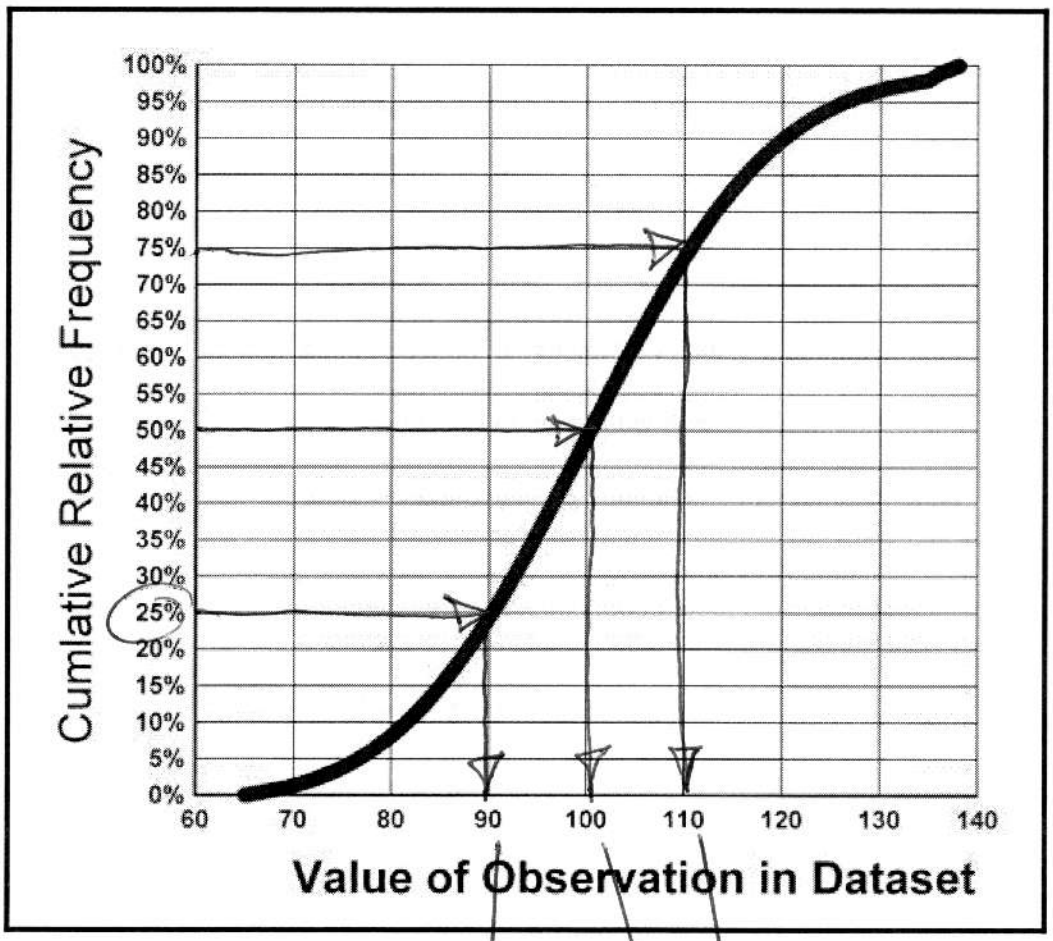
Graph of the 100 values on the previous page. You can use this to help construct the required boxplot if you want to do so.



P_{25} Q_1 $= 90$

P_{50} Q_2 $= 101$

P_{75} Q_3 $= 110$