

Homework #1

- A. The data are from the U.S. Department of Health and Human Services, National Center of Health Statistics, Third National Health and Nutrition Examination Survey. The systolic blood pressure (mmHg) for 80 patients was measured. The following data is separated by gender.

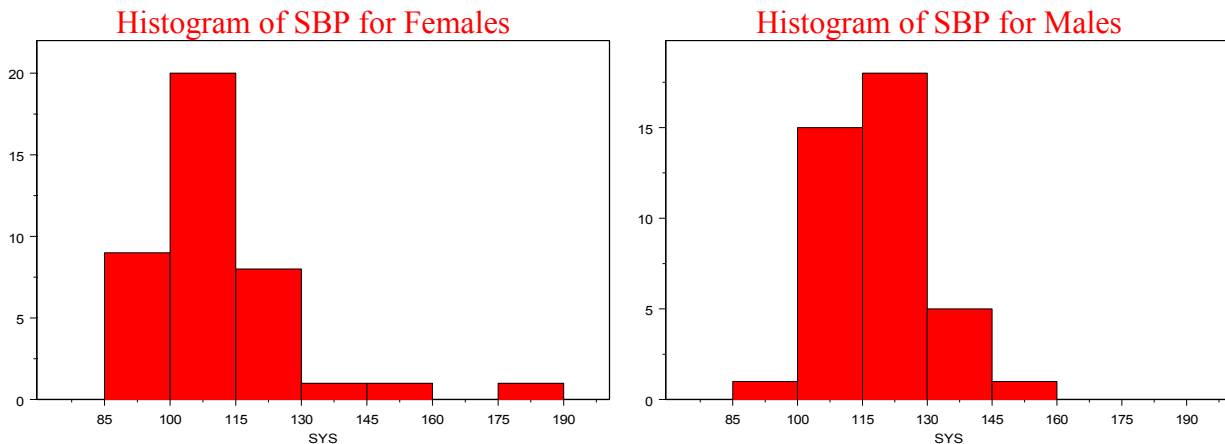
Females: 89 92 93 93 94 95 97 98 99 100 101 102 104 104 104 105 106
106 107 107 107 108 108 110 112 113 113 114 114 116 116 118
119 123 124 125 127 133 155 181

Males: 95 107 107 109 109 110 110 110 110 110 112 112 112 112 113
113 115 115 116 116 118 119 120 121 121 124 125 125 125 125
125 126 126 127 131 131 132 132 137 153

1. Construct a frequency distribution for the systolic blood pressure measurements for both female and males. Use 7 classes beginning with a lower class limit of 85 and a class width of 15.

SBP	Midpoints	Frequency (F)	Frequency (M)
85 – 99	92	9	1
100 - 114	107	20	15
115 – 129	122	8	18
130 – 144	137	1	5
145 – 159	152	1	1
160 – 174	167	0	0
175 – 189	182	1	0

2. Construct a histogram of systolic blood pressure for both females and males. Are the distributions symmetric or skewed? If skewed, are they skewed to the left or to the right?



The distributions are skewed to the right. The females are more skewed than the males.

3. Calculate the mean and the median systolic blood pressure for both genders. Compare the measures of center and comment.

Females: $\mu = 110.8, \mu_{FD} = 110.375$
 $M = 107, M_{FD} = 107$

Males: $\mu = 118.9, \mu_{FD} = 118.25$
 $M = 117, M_{FD} = 117$

- All measures of center for SBP are higher for males.
- On average, men have higher SBP than women.

4. Calculate the standard deviation and variance of systolic blood pressure for both genders. Compare the standard deviations and comment.

Females: $\sigma = 16.8985, \sigma_{FD} = 17.4821$
 $\sigma^2 = 285.56, \sigma_{FD}^2 = 305.625$

Males: $\sigma = 10.3315, \sigma_{FD} = 12.1291$
 $\sigma^2 = 106.74, \sigma_{FD}^2 = 147.1154$

- Women have a larger standard deviation.
- There is more variation amongst the SBP measurements for women than for men.

5. Construct a frequency distribution for all 80 systolic blood pressure measurements. Use the same class intervals as above. Also include the relative frequencies.

SBP	Midpoints	Frequency	Relative Frequency
85 – 99	92	10	0.1250
100 - 114	107	35	0.4375
115 – 129	122	26	0.3250
130 – 144	137	6	0.0750
145 – 159	152	2	0.0250
160 – 174	167	0	0.0000
175 – 189	182	1	0.0125

6. Calculate the interval of systolic blood pressure measurements that are 2 standard deviations from the mean, where the mean is 114.85 mmHg and the variance is 201.1793 (mmHg)².

$$x_L = 114.85 - 2(14.1838) = 86.4824$$

$$x_U = 114.85 + 2(14.1838) = 143.2176$$

$$(86.48, 143.22)$$

7. Identify any outliers and calculate their z-score.

$$153: z_{153} = \frac{153 - 114.85}{14.1838} = 2.6897$$

$$155: z_{155} = \frac{155 - 114.85}{14.1838} = 2.8307$$

$$181: z_{181} = \frac{181 - 114.85}{14.1838} = 4.6897$$