

Seminar 11 (Suggested Solution)

1.

Class Mid-point (m_i)	Frequency (f_i)	$m_i f_i$	$m_i - \bar{x}$	$ m_i - \bar{x} f_i$	$(m_i - \bar{x})^2$	$(m_i - \bar{x})^2 f_i$
12.7	12	152.4	-9.9	118.8	98.01	1176.12
17.2	24	412.8	-5.4	129.6	29.16	699.84
21.7	25	542.5	-0.9	22.5	0.81	20.25
26.2	28	733.6	3.6	100.8	12.96	362.88
30.7	21	644.7	8.1	170.1	65.61	1377.81
		2486		541.8		3636.9

$$\text{Mean} = 2486 / 110 = 22.6$$

$$\text{MAD} = 541.8/110 = 4.925$$

$$\text{Variance} = 3636.9/(\mathbf{110-1}) = 33.3660$$

$$\text{S.D.} = 5.7763$$

2. mean = $245/20 = 12.25$

a. Range = $28 - 3 = 25$

b. MAD = $99.5/20 = 4.975$

c. Sample Var. = 42.5132

d. Sample S.D. = 6.5202

e. Interquartile Range = $Q_3 - Q_1 = 15 - 8 = 7$

f. C.V. = $6.5202 / 12.25 \times 100 = 53.2261$

3. a. Outlier is defined as a value that is more than 1.5 times the interquartile range larger than Q_3 or smaller than Q_1 .

b. $Q_1 = (20+1)/4^{\text{th}}$ observation
 $= 5.25^{\text{th}}$ observation $\cong 5^{\text{th}}$ observation
 $= 8$

$Q_2 = \text{median} = 10.5^{\text{th}}$ observation = 19.5

$Q_3 = 3(20+1)/4^{\text{th}}$ observation
 $= 15.75^{\text{th}}$ observation $\cong 16^{\text{th}}$ observation
 $= 30$

interquartile range = $Q_3 - Q_1 = 30 - 8 = 22$

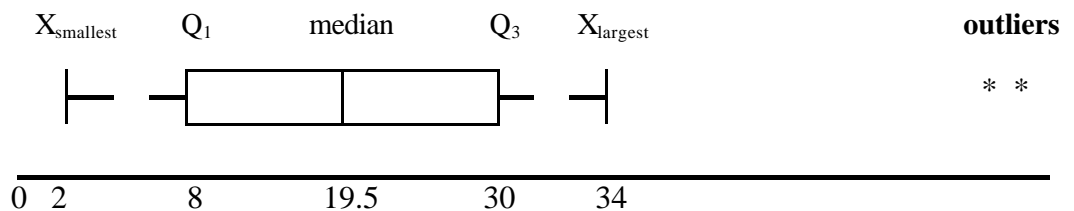
$Q_1 - 1.5 \text{ interquartile range} = 8 - 1.5 \times 22 = -25$

$Q_3 + 1.5 \text{ interquartile range} = 30 + 1.5 \times 22 = 63$

Values less than -25 or greater than 63 are outliers.

There are two outliers in the data set: 87 and 90

c.



d.

population mean = $\mu = 24.40$

population standard deviation = $\sigma = 23.098$

median = 19.5

Coefficient of Skewness = $\frac{3(\text{mean} - \text{median})}{\text{standard deviation}}$
 $= \frac{3(24.40 - 19.5)}{23.098} = 0.6364$

e.

The data distribution is positively skewed.

f.

Median is more appropriate.

Since mean is affected by extremely values, and there are two outliers in the data set.