## Seminar 9 (Suggested Solution)

1. a. mean = 83/11 = 7.55

| | | | | | | |
|---|---|---|---|---|---|---|
| 8 | 1 | 2 | 4 | 10 | 12 | 37 |
| 7 | 8 | 10 | 10 | 11 | 46 | |

2.

| $X_i$ | Weighting ($X_i$) | $X_iW_i$ |
|---|---|---|
| 70 | 0.2 | 14 |
| 65 | 0.2 | 13 |
| 90 | 0.2 | 18 |
| 85 | 0.4 | 34 |
| | 1.0 | **79** |

3.

| Hours studying per week | Class mid-point ($m_i$) | Frequency ($f_i$) | $m_if_i$ |
|---|---|---|---|
| 0 | 0 | 5 | 0 |
| 1-5 | 3 | 96 | 288 |
| 6-10 | 8 | 57 | 456 |
| 11-15 | 13 | 25 | 325 |
| 16-20 | 18 | 11 | 198 |
| more than 20 | **23 / 25.5 / 30.5** | 6 | 138 / 153 / 183 |
| | | 200 | 1405/1420/1450 |

mean = **7.025 / 7.1 / 7.25**

There is less than 5% variation in the mean value.

In ***normal*** case, only 5 –10% of the total frequency would fall into the open-ended class, so the different estimation of the class mid-point doesn' t have too much effect on the mean.

4. a. mean = 245/20 = 12.25

b.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 4 | 5 | 6 | 8 | 8 | 9 | 10 | 10 | 11 |
| 11 | 14 | 14 | 14 | 15 | 15 | 15 | 20 | 25 | 28 |

mode = 14, and 15

c. median = $(20+1)/2^{th}$ observation
= $10.5^{th}$ observation
= (11+11)/2 = 11

d. midrange = (3 + 28)/2
= 15.5

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

f. $Q_2$ = median = 11

g. $Q_3 = 3(20+1)/4^{th}$ observation
= $15.75^{th}$ observation $\cong 16^{th}$ observation
= 15

h. Midhinge = $(Q_1 + Q_3)/2$
= (8 + 15)/2 = 11.5

5. *Advantages of Midrange*:

The midrange is easy to understand and to calculate.

*Disadvantages of Midrange:*

i. It is *heavily influenced by extreme values*.
ii. *Open-ended distributions have no midrange* because no "highest" or "lowest" value exists in the open-ended class.
iii. The midrange is *less stable of measures*. for example, in repeated samples taken from the some sources, the midrange will exhibit more variation from sample to sample than the other measures.

*Advantage of Midhinge:*

Although they are more complicated to calculate than the midrange, they *ignore extreme values by using only the middle half of the data.* Thus they have a distinct advantages over the range, which is *affected by the extreme values*.

*Disadvantage of Midhinge:*

Like the midrange, the midhinge is *based on only two values* from the data set.