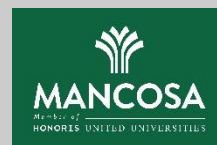


APPENDIX A: ASSESSMENT COVER SHEET**ASSESSMENT COVER SHEET**

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Declaration: I hereby declare that the assignment submitted is an original piece of work produced by myself.			

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Question 1

Data

Length of training session (minutes)	Frequency (f)
20 < 40	7
40 < 60	11
60 < 80	Z
80 < 100	9
100 < 120	5
120 < 140	2
Σ	50

(i) **Finding the value of Z**

$$\Sigma f = 50$$

$$7 + 11 + Z + 9 + 5 + 2 = 50$$

$$34 + Z = 50$$

$$Z = 50 - 34$$

$$Z = 16 \quad \text{shown!}$$

(ii) **Estimated mean time of the training session**

Midpoint = (Lower limit + Upper limit) / 2

Length of training session (minutes)	Frequency (f)	Cumulative Frequency (F)	Midpoint (m)	fm
20 < 40	7	7	30	210
40 < 60	11	18	50	550
60 < 80	16	34	70	1120
80 < 100	9	43	90	810
100 < 120	5	48	110	550
120 < 140	2	50	130	260
Σ	50			3500

$$\bar{x} = \frac{\Sigma fm}{\Sigma f} = \frac{3500}{50} = 70.0$$

(iii) Median

$$\text{Median position} = \frac{\Sigma f}{2} = \frac{50}{2} = 25^{\text{th}} \text{ minute}$$

$$\text{Median value} = L + C \left(\frac{\frac{\Sigma f}{2} - F_{<}}{f_{\text{me}}} \right)$$

L = lower limit of the median class

C = class width (upper limit – lower limit)

$F_{<}$ = cumulative frequency of the classes before the median class

f_{me} = frequency of the median class

$$\text{Median value} = 60 + 20 \left(\frac{\frac{50}{2} - 18}{16} \right) = 60 + \frac{20(25 - 18)}{16} = 60 + \frac{20(7)}{16} = 68.75$$

(iv) Mode

Mode is the class with the highest frequency.

$$\text{Mode} = L + \frac{C(f_m - f_{m-1})}{2f_m - f_{m-1} - f_{m+1}}$$

L = lower limit of the modal class

C = class width

f_m = frequency of modal class

f_{m-1} = frequency of the class just before the modal class

f_{m+1} = frequency of the class just after the modal class

$$\text{Modal value} = 60 + \frac{20(16 - 11)}{2(16) - 11 - 9} = 60 + \frac{100}{12} = 68.333$$

(v) Skewness of the data

The data is positively skewed. This is because mode < median < mean.

(vi) Standard deviation

Length of training session (minutes)	Frequency (f)	Midpoint (m)	fm	fm ²
20 < 40	7	30	210	6300
40 < 60	11	50	550	27500
60 < 80	16	70	1120	78400
80 < 100	9	90	810	72900
100 < 120	5	110	550	60500
120 < 140	2	130	260	33800
Σ	50		3500	279400

Standard deviation (SD) = $\sqrt{\text{Variance}}$

$$\text{Variance} = \frac{\sum fm^2 - n\bar{x}^2}{n - 1} \quad n = \sum f$$

$$\text{Variance} = \frac{279400 - 50 * 70^2}{50 - 1} = \frac{279400 - 245000}{49} = \frac{34400}{49} = 702.0408163$$

$$SD = \sqrt{702.0408163} \approx 26.50 \text{ minutes}$$

References

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