

Railway Engineering Mathematics

Tutorial Sheet 23

1. Consider the following data set:

59	11	81	41	67	27	53	17	55	34
39	65	71	52	68	64	47	55	58	49
66	43	75	60	54	63	91	25	46	69
87	31	66	92	78	48	58	62	73	51

This data is available on Blackboard in the file “REM_Tutorial23DataQ1.xlsx”.

- (a) Determine the mean, and both the sample and population standard deviation, **using the following formulae** in EXCEL.

$$\bar{x} = \frac{\sum_{i=1}^n x_i}{n}, \quad \sigma_{pop} = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}}, \quad \sigma_{samp} = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n - 1}}$$

- (b) Use EXCEL’s built in functions to calculate the mean (**AVERAGE**) and standard deviation (**STDEV.D** or **STDEV.P**, for sample and population, respectively). Do the results agree with your results from part (a)?
- (c) Calculate the median, mode and the upper and lower quartiles using the **QUARTILE.EXC** function. Then use these to determine the interquartile range.

2. (a) Repeat the above question for the following data set:

40	71	45	78	37	79	42	38	78	40
81	84	27	79	41	81	39	90	41	80
78	42	76	44	81	25	77	49	70	31
82	42	84	36	41	51	80	77	39	43
78	84	44	35	73	40	80	78	81	46

The data are available on Blackboard in the file, “REM_Tutorial23DataQ2.xlsx”.

- (b) Describe any qualitative differences between the above two data sets.