

TUTORIAL SHEET 2

Variation; Comparing Data Sets

Unless instructed otherwise, use Minitab for your analysis.

1. Question 4 on sheet 1 gave the length increases (cm) of tension members of a simple steel scaffold structure under a load of 200 kg as:

2.5, 2.2, 3.0, 2.1, 2.7, 2.5, 2.8, 1.9, 2.2.

- (a) Calculate the range and interquartile range of this data by hand.
- (b) Use the statistical functions on your calculator to find the standard deviation of length increases.
2. Consider again the task time data in question 3 of tutorial 1. Select an appropriate measure of variation for this data, bearing in mind the shape of the distribution. Use Minitab to find its value.
3. Using the camshaft length data in camshaft.mtw, complete the following table:

		Mean	S.D.
Camshaft	Plant		
lengths (mm)	Supplier 1		
	Supplier 2		

What conclusions can you draw from this? (*The background to the data is on the 'Data Sets' sheet.*)

4. It is required to compare the mean activation times of three types of fire detection systems. A number of tests were carried out on each type of component in which the activation times under controlled conditions, which are thought to follow a symmetrical normal distribution, were recorded as follows (times in seconds):

Type 1	15.93	13.69	14.93	15.51	14.79	16.84
	14.96	17.93	17.07	18.21	16.47	
Type 2	15.09	13.65	17.86	16.73	15.30	15.41
	17.73	18.42	17.19	16.16	17.08	
Type 3	10.17	14.13	12.91	13.10	12.34	12.67
	14.37	12.43	12.20	15.00	14.54	

- (a) Summarise the data graphically using dot plots on the same scale.
- (b) Calculate the mean and standard deviation of the three types of detection system, and compare them. What conclusions can you draw? (Comparisons are easier if all the 33 data values are entered in one column and another column is created containing 1, 2 or 3 to denote which type the value corresponds to.)
5. With reference to question 3, stack the camshaft lengths for supplier 1 on top of those for supplier 2 (giving one column containing 200 lengths) and create another column of 100 '1's and 100 '2's to indicate the corresponding supplier. Then construct boxplots to graphically compare the camshaft lengths from each supplier.