Solutions for Assignment 2

A2Q1.

a. The data show no clear trends or sustained cycles; the results seem random.

b. The manufacturer can be sure that the average bumps-to-failure rate is satisfactory. The 95% confidence interval for the population mean ranges from about 40,550 to 42,250. (For comparison to a hypothesis test, the one-tailed p-value for testing a mean of 40,000 is 0.0007 and is quite conclusive.) However, the performance of the shock absorbers varies greatly; 63 of the 160 (39%) shocks fails to reach the standard. (The quantile plot is useful for identifying such percentages.) The problem appears to be excessive variability rather than an inadequate average.

A2Q2.

a. Neither trends nor cycles appear in the time plot. Alphabetical order, however, shouldn't have anything to do with performance.

b. The sample mean, 8.50, is higher than the S&P return, suggesting that the managers collectively average higher than the market. A 95% confidence interval goes from 8.37% to 8.64%; the true performance might be anything from very slightly above the S&P to about .3 percentage points above. From a testing point-of-view, the one-tailed p-value 0.0092 indicates that we have conclusive evidence that the mean performance is somewhat above the S&P. On the other hand, the performance of the managers is quite variable and many do worse than the S&P.

A2Q3.

The average stockout level is clearly higher than target. The confidence interval ranges from 21.2 to 35.1. It doesn't seem to be just a random fluke. Plotting stockout against store number (or doing a Many Sample analysis) shows that store 3 has a noticeably higher stockout rate. Some others, such as store 8, are also doing poorly (too many stockouts). From a testing approach, the p-value for the null hypothesis that the mean is 20 versus a two-sided alternative is .023, quite small and conclusive.