Statistical Process Control

1. Twenty-five parts are sampled each day and found to have an average width of 2 inches, with a standard deviation of 0.1 inches. What are the control limits that include 99.73% of the sample means?

2. Several samples of size $n = 8$ have been taken from today's production of parts. The average part was 3 yards in length and the average sample range was 0.015 yards. Find the 99.73% upper and lower control limits.

3. The average range of a process is 10 lbs. The sample size is 10. Develop upper and lower control limits on the *range*.

Statistical Process Control Project

4. The Consumer Product Safety Commission (CPSC) was very satisfied with your firm's work in the hoverboard problem earlier this semester. They connected you with the supplier of the batteries for Brand D. The company now needs help to explain why many of the batteries are defective. Your firm will use its extensive knowledge of statistical process control to identify where the problems may lie and what they can do to keep their process in control. They are especially interested in finding main causes of variability to address the issues. The manufacturer has supplied you with some of their quality control measurements (n=5 units in each of 147 samples over 6 months) for the resistance in battery lead connections, determined to be a major source of fault. These data are found on Canvas, *hoverBatteriesDF.csv*. Included in these data are the day of the month and month of the sampled measurement. The company's records aren't super, but sometime during the process the company switched suppliers for a major component. A few months earlier the plant closed for annual maintenance and the machine creating lead connectors went through extensive upgrades. You suspect these events may have changed the process. Identify these key dates (based on process changes) and comment on the process before and after. Determine which type of control charts to use and discuss how you would maintain better control of the process in the future.