

1. For the following data points, compute a 90% confidence interval for the standard deviation (assume normality).

Volume	16.1	16	16.3	15.6	15.9	15.8
Frequency	2	5	3	4	2	4

2. Tensile strength data from the six specimens were as follows: 780, 690, 650, 720, 680, 580 MPa. Determine the 99% upper confidence bound for the tensile strength mean.
3. A textile fibre manufacturer is investigating a new drapery yarn, which the company claims has a mean thread elongation of 12 kg with the variance of 0.25. The company wishes to test $H_0: \mu \geq 12$ against $H_1: \mu < 12$ using a random sample of 16 specimens.
 - a. What is type I error probability if the critical region is defined as $\bar{X} < 11.5\text{kg}$?
 - b. Find type II error for the case where the true mean is 11.25kg?
4. Light bulb has an average life time of 300 days. A researcher randomly selects 15 bulbs for testing. Sampled bulbs last on average 290 days with standard deviation of 50 days. What is the probability that 15 randomly selected bulbs would have on average life of no more than 290 days? (Assume normality)
5. A battery manufacturer determines its battery output voltage has a standard deviation of 0.12 volt for its 9-volt battery. It wishes to test a null hypothesis $H_0: \mu \geq 9$ with the acceptance region $8.7 \leq \bar{X} \leq 9.1$ using 6 batteries.
 - a. Determine type I error probability.
 - b. What is the test power if the true mean is 9.2volt?
6. You form a null hypothesis $H_0: \mu = 20$ with 20% significant level. To test this, you collect the following data: 15, 21, 26, 22, 19, 23, 24, 28. Do you accept/reject the null hypothesis based on the data set?