

SM 316 – Spring 2019

Homework 6

Due: Monday 20 MAR 2019

PLEASE READ THE INSTRUCTIONS/SUGGESTIONS ON THE COURSE WEBPAGE.

Hand in the following problems:

1. The length of time for one individual to be served at a cafeteria is a random variable having an exponential distribution with a mean of 4 minutes. What is the probability that a person is served in less than 3 minutes?
2. The life, in years, of a certain type of electrical switch has an exponential distribution with an average life $\beta = 2$. what is the probability it fails during the first year?
3. The lengths of time, in minutes, that 10 patients waited in a doctors office before receiving treatment were recorded as follows: 5, 11, 9, 5, 10, 15, 6, 10, 5, and 10. Treating the data as a random sample, find
 - (a) the sample mean;
 - (b) the sample mode;
 - (c) the sample median;
 - (d) the sample variance;
4. If the standard deviation of the mean for the sampling distribution of random samples of size 36 from a large or infinite population is 2, how large must the sample size become if the standard deviation is to be reduced to 1.2?
5. A soft-drink machine is regulated so that the amount of drink dispensed averages 240 milliliters with a standard deviation of 15 milliliters. Periodically, the machine is checked by taking a sample of 40 drinks and computing the average content. If the mean of the 40 drinks is a value within the interval $\mu_{\bar{X}} = \pm 2\sigma_{\bar{X}}$, the machine is thought to be operating satisfactorily; otherwise, adjustments are made. The company official found the mean of 40 drinks to be $\bar{X} = 236$ milliliters and concluded that the machine needed no adjustment. Was this a reasonable decision?
6. If a certain machine makes electrical resistors having a mean resistance of 40 ohms and a standard deviation of 2 ohms, what is the probability that a random sample of 36 of these resistors will have a combined resistance of more than 1458 ohms?