

Probability and Statistics

Mock Test

Maximum Points= 20

Time= 45 minutes

- Q1. A general store distributed a certain type of bread with an average length of 35 cm and $\sigma = 3$ cm. Suppose that the length is normally distributed, what % of the bread's pieces are
1. Less than 26.6 cm?
 2. More than 37.5 cm?
 3. Between 30.7 and 37.4 cm?
- Q2. The average life of a certain machine is 15 months with a standard deviation of 3 months. The company replaces all the machines that stops working without any cost under some guarantee. If it is willing to replace only 4 percent of the machines that stops working, how long a guarantee should be offered? Suppose that the life of a machine follows the normal distribution.
- Q3. A certain automobile engine emits 150 mg nitrogen oxides per second on average. A modification to the engine has been proposed that may reduce the emissions. A random sample of 55 modified engines with the sample mean 98 mg/s and sample standard deviation 23 mg/s is taken and emission measurements are recorded. Test the hypothesis that the emission rate of modified engines is less than 150. Use P-value in your conclusion.
- Q4. A company has developed a new battery. The in charge engineer claims that the new battery will operate for at least 8 minutes longer than the old battery. To test the claim, the company selects a simple random sample of 100 new batteries and 100 old batteries. The old batteries run continuously for 190 minutes with standard deviation of 20 minutes; the new batteries, 200 minutes with a standard deviation of 40 minutes. Test the engineer's claim that the new batteries run at least 8 minutes longer than the old. Use a 0.05 level of significance.

GOOD LUCK