

MATH MODELS FOR COMPUTER SCI - EXAM III

Name _____

(8 pts) Suppose that in the production of 50Ω resistors, non-defective items are those that have a resistance between 45Ω and 55Ω and the probability of a resistor's being defective is 0.2% . The resistors are sold in lots of 100, with the guarantee that all resistors are non-defective. What is the probability that a given lot will violate this guarantee? (Use the Poisson distribution).

(8 pts) If the life of tires is normal with mean 25000 km and variance 25000000 km^2 , what is the probability that a given one of those tires will last at least 30000 km? At least 35000 km?

(8 pts) Suppose that 5 times 10 trials were made and in the first 10 trials A happened 7 times, in the second 10 trials A happened 6 times, in the third 10 trials A happened 6 times, in the fourth 10 trials A happened 5 times, and in the fifth 10 trials A happened 7 times. Find a maximum likelihood estimate of p based in this information.

(8 pts) Find a 95% confidence interval for the variance of a normal population from a sample of 20 bolts with sample variance 0.04 cm^2 .

(8 pts) Using the sample

0.80, 0.81, 0.81, 0.82, 0.81, 0.82, 0.80, 0.82, 0.81, 0.81

(length of nails in inches),

- a) find the sample mean \bar{x}
- b) find the sample variance s^2
- c) test the hypothesis $\mu = 0.8$ in. (the length indicated on the box) against the alternative $\mu \neq 0.80$ in. (Assume normality, choose $\alpha = 5\%$).