ENGR 0020 PROB & STAT FOR ENGINEERS I

Recitation 7

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Office Hour: Thursday 2:00 – 3:00pm, 1023 Benedum Hall

Goals:

1. To help to understand the lecture and homework questions.
2. To take quizzes for getting the feedback of the class. The quizzes will take 10 mins at the end of recitation.

1. **(Sample using Matlab)**
   (a) Using Matlab, show how to generate a normal sample of size of $n = 100$ with $\mu = 1$ and $\sigma^2 = 4$. Repeat this experiment for $m = 20$ times and use histogram to verify the sample mean is normal distributed.
   (b) Generate a sample of an exponential random variable with $\lambda = 2$ from a $[0, 1]$ uniformly distributed random variable and show it using Matlab.

2. **(Expectation and variance of Sample mean, CLT; Exercise 8.23, p242)** The random variable X, representing the number of cherries in a cherry puff, has the following probability distribution:

x	4	5	6	7
$P(X = x)$	0.2	0.4	0.3	0.1

   (a) Find the mean μ and the variance σ^2 of X.
   (b) Find the mean $\mu_{\bar{X}}$ and the variance $\sigma^2_{\bar{X}}$ of the mean $\bar{X}$ for random samples of 36 cherry puffs.
   (c) Find the probability that the average number of cherries in 36 cherry puffs will be less than 5.5.

3. **(Difference between two sample means)** The mean score for freshmen on an aptitude test at a certain college is 540, with a standard deviation of 50. Assume the means to be measured to any degree of accuracy. What is the probability that two groups selected at random, consisting of 32 and 50 students respectively, will differ in their mean scores by
   (a) more than 20 points?
   (b) an amount between 5 and 10 points?