Sta347 Probability I

Homework 2

Oct. 30, 2013

Due Nov. 7, 2013 in class

- You should work out this Homework individually. Group works or discussions are not acceptable.
- No late Homework will be accepted.

(1) Problem 7 on Page 45 of the Textbook.

(2) Problem 1 on Page 65 of the Textbook.

(3) Problem 6 on Page 65 of the Textbook.

(4) Customers leaving a subway station can exit through any one of three gates. Assuming that any particular customer is equally likely to select any one of the three gates, find the probabilities of the following events among a sample of four customers.

   (a). Two select gate A, one select gate B, and one select gate C.

   (b). All four select the same gate.

   (c). All three gates are used.

(5) In a large lot manufactured items, 10% contain exactly one defect and 5% contain 2 or more defects. Ten items are randomly selected from this lot for sale, and the repair costs total $X_1 + 4X_2$, where X_1 is the number among the 10 having exactly one defect, and X_2 denotes the number among the 10 having two or more defects. Find the expected value of the repair costs. Find the variance of the repair costs.

(6) Show that the moment generating function of a binomial random variable is given by $M(t) = (pe^t + q)^n$.

(7) Suppose that X is a negative binomial random variable with parameters p and r. Find the moment generating function of X. Find the mean and variance of X using the moment generating function.