

STAT/MA 416 Fall 09 Section 002

Homework 7

Due: October 23, 2009, 9:30am

Please show all your work, don't just write down the final number.

- Reading: Chapter 6.1, 6.2.4, 6.2.5, handout on the DeMoivre-Laplace limit theorem (alternatively, chapters 12.2.2-12.2.3)
 - Exercises: 6.2.15, 6.2.16, 6.2.17, 6.2.27, 12.2.7 (use continuity correction for 12.2.7)
 - Ross (8th edition, problems should match the 7th edition)
- 4.79 Suppose that a batch of 100 items contains 6 that are defective and 94 that are not defective. If X is the number of defective items in a randomly drawn sample of 10 items from the batch, find (a) $P(X = 0)$ and (b) $P(X > 2)$.
- 5.10 Trains headed for destination A arrive at the train station at 15-minute intervals starting at 7 A.M., whereas trains headed for destination B arrive at 15-minute intervals starting at 7:05 A.M.
- (a) If a certain passenger arrives at the station at a time uniformly distributed between 7 and 8 A.M. and then gets on the first train that arrives, what proportion of time does he or she go to destination A ?
 - (b) What if the passenger arrives at a time uniformly distributed between 7:10 and 8:10 A.M.?
- 5.11 (On a harder side, not graded) A point is chosen at random on a line segment of length L . Interpret this statement, and find the probability that the ratio of the shorter to the longer segment is less than $\frac{1}{4}$.
- 5.18 Suppose that X is a normal random variable with mean 5. If $P(X > 9) = 0.2$, approximately what is $Var(X)$?
- 5.20 If 65 percent of the population of a large community is in favor of a proposed rise in school taxes, approximate the probability that a random sample of 100 people will contain
- (a) at least 50 who are in favor of the proposition;
 - (b) between 60 and 70 inclusive who are in favor;
 - (c) fewer than 75 in favor.
- (Hint: use continuity correction.)