Math 530

Autumn 2006

Quiz 4

Instructions: This quiz is worth a total of 20 points with the point value of each question is listed with each question. You may use any notes or books but you must work individually. Make sure to write clearly and justify your answers.

(1.)(5 pts.) Suppose that a box contains 5 balls numbered 1 through 5. Three draws are made without replacement. Let X be the sum of the numbers on the first two draws and let Y be the sum of the numbers on the last two draws.

(a.) Construct a table for the joint distribution of X and Y.

(b.) Find the distribution of $\max(X, Y)$.

(2.)(6 pts.) An 8-sided die is rolled 9 times. Find the expectation of

(a.) The sum of the 9 rolls.

(b.) The maximum number in the first six rolls.

(c.) The number of values which do not appear in the first 8 rolls.

(3.)(5 pts.) A box contains 4 tickets numbered 0,1,1 and 2. Tickets are drawn with replacement. Suppose X_i is the number of the ticket on draw i and $S_n = X_1 + \cdots + X_n$. Find the approximate value of $P(S_{100} > 90)$.

(4.)(4 pts.) Let X and Y be independent random variables which are both uniformly distributed on $\{1, \ldots, 10\}$ and let $S = X + Y$. Find:

(a.) $P(S \leq 4)$

(b.) $P(S \leq 4 | X \leq 2)$