

Math 244 Exam II, Fall

Name: _____

November 18, 2009

Student #: _____

Instructor: Dhar

Must show all work for full credit!!!

I pledge that I have not violated the NJIT code of honor _____

1. An urn contains 10 balls numbered 1 to 10. Four balls are to be randomly selected without replacement from this urn. Let X denote the largest number among the four balls selected. Find the probability mass function $P(X = x)$.
(14 pts) (Please see solution example 1b, page 118)

2. A school class of 120 students is driven in four busses to an excursion. There are 25 students in one of the buses, 30 in another, and 27 in yet another and 38 in the fourth. When the bus arrives at the destination, one of the 120 students is randomly chosen. Let X denote the number of students on the bus of that randomly chosen student, find $E(X)$ and variance of X . How will the expected value of X compare with the simple average $(25+30+27+38)/4$? Why? (20 pts) (Please see example 3d, page 127 and problem 4.37, page 176).
3. A fair coin is continually flipped until heads appears for the 20th time. Let X denote the number of tails that occur. Compute the probability mass function of X . Explain. (Please see problem 4.75 page 178) (12 pts)
4. An urn contains 5 blue and 4 yellow balls. A fair die is rolled and that number of balls is randomly chosen from the urn. What is the probability that all the balls selected are blue? Explain. (Please see problem 3.47, page 105) (14 pts)

5. A satellite system consists of 5 components and functions on any given day if at least 3 of the 5 components function on that day. On a rainy day each of the components independently functions with probability 0.40, whereas on a dry day they each independently function with probability 0.7. If the probability of rain tomorrow is 0.20 (i.e., probability of dry day is 0.80), what is the probability that the satellite system will function? (Please see problem number 4.44, page 176). (16 pts)
6. The expected number of typographical errors on a page of a certain magazine is 0.25. What is the probability that the next page you read contains no error? What is the probability that the popular article which is written on five pages in this magazine contains at least one typographical error? (14 pts)
7. Consider the random variable X , whose probability mass function is given by $p_X(1) = 0.5$, $p_X(2) = 0.1$, $p_X(4) = 0.1$, $p_X(6) = 0.3$. Clearly write down its cumulative distribution function. (Please see page 125). (10 points)