Math 407, Quiz 1

10 am on Wed. Feb. 17 until 10 am on Thu. Feb. 18

You may use a calculator (without internet connection or other communication capabilities). You are allowed to look at the textbook, or at the lecture notes from class. However no other sources (for example the internet) are allowed. TO GET FULL CREDIT, WORK MUST ME SHOWN. Upload your solutions to blackboard as a pdf file.

1. The probability of event A is $1/3$. The probability of event B is $1/4$. Say whether each of the following is true or false, and explain briefly.

a) If A and B are mutually exclusive, the chance they both happen must be $1/3 * 1/4 = 1/12$.

b) If A and B are independent, the chance they both happen must be $1/3 * 1/4 = 1/12$.

c) The chance that at least one of A or B happens must be $1/3 + 1/4$.

d) If A and B are mutually exclusive, the chance that at least one of A or B happens must be $1/3 + 1/4$.

e) If A and B are independent, the chance that at least one of A or B happens must be $1/3 + 1/4$.

2. Eight dice are rolled. Four dice are blue and four are red. Find formulas for

a) The probability that exactly four of the eight dice are sixes.

b) The probability that exactly two of the blue dice are sixes and exactly three of the red dice show even numbers.

c) The probability that there are the same number of sixes showing among the blue dice as among the red dice.

3. A student takes an exam where each question has 4 possible answers. He works a question correctly if he knows the answer, and otherwise he guesses at random. Suppose he knows the answer to 60 percent of the questions.

a) What is the chance that on a question chosen at random, the student gets the correct answer ?

b) Given that the student gets the correct answer to this question chosen at random, what is the probability that he actually knew the answer ?

c) Suppose there are 10 questions on the exam. Let N be the number of questions that the student gets correct. Find $E(N)$.