Pretest for Midterm 2: Note: give all answers to two significant figure. You must show all your work.

1. (a) 5 random numbers (integers) are chosen from 1 through 10. Find the probability that the numbers are all different.
   (b) Find the probability that one of these numbers is repeated.

2. Five (different) cards are chosen from a well shuffled standard deck of 52 cards. What is the probability that they all have the same suit. (For example, all diamonds.)

3. Mary and Jane are close friends in a class of 20 students. The teacher randomly selects a committee of 4 from this class.
   (a) What is the probability that they are both on the selected committee?
   (b) What is the probability that they are both not on the selected committee?
   (c) What is the probability that Mary is selected, but not Jane?

4. Ten fair coins are tossed. Find the probability of a 6-4, or a 5-5 split. (Note: this means 6H4T or 5H5T or 4H6T.)

5. A card is chosen at random from a standard deck of cards. If it is an honor card (10, J, Q, K, or Ace) you win $5. Otherwise, you lose $2. Is this a fair game? What are your expected winnings?

6. The following game is played. A pair of dice is tossed. If each of the dice have the same number (for example, 4-4), you win the total thrown. (For example, if 4-4 is thrown, you win $8.) But if doubles are not thrown, you lose $1. What is your expectation for this game? Is it a favorable or unfavorable game for you?

7. (a) State a theorem relating the probability of Outcome1 or Outcome2 in terms of the individual probabilities of Outcome1 and Outcome2.
   (b) State a theorem relating the probabilities of success and failure of an outcome.