Midterm #1
Math 201
Introduction to Probability
Tuesday, October 2, 2007

Last Name:

First Name:

Middle Name(s):

Who is your instructor?  
☐ Shannon Starr (MWF 12-1pm)  
☐ Andrew Ledoan (MW 3:25-4:40pm)

Below this line: Graders use only!

#1:  /12  #4:  /12  #7:  /10
#2:  /10  #5:  /12  #8:  /12
#3:  /10  #6:  /10  #9:  /12

TOTAL:  /100
1. (12 points) How many different letter arrangements can be made from the letters of the word: “c o m m i t t e e”? You can leave your answer as a ratio (of factorials).

2. (10 points) There are 9 people at a dinner party. A toast is made and everybody clinks everybody else’s glass. How many glass clinks are there? Calculate the actual number.
3. (10 points) Find the coefficient of $x^2y$ in the expansion of $(5x + 2y + 3)^4$.

4. (12 points) Solve for $n$ in the equation

$$2 \binom{n}{2} + 25 = \binom{2n}{2}.$$ 

Note that $n \geq 0$. 
5. (12 points) Out of 100 students, 73 are taking geometry, 49 are taking French and 61 are taking physics. Also, 36 are taking both French and geometry, 45 are taking geometry and physics, and 24 are taking French and physics. There are 10 students not taking any of the three. If a student is selected at random, what is the probability that (s)he is taking all three?

6. (10 points) Two cards are randomly selected from a deck (without replacement). What is the probability that they are both face cards? I.e., what is the probability that both the cards are a Jack, Queen or King? (They do not both have to be the same card. E.g., a Jack, then a Queen is good.)
7. (10 points) Find the simplest expressions for the following events:

(a) \((E \cup F) \cap (E \cup F^c)\)  
(b) \(F \cup F^c\)  
(c) \((E^c \cap F^c)^c\)  
(d) \((E \cup F) \cap (F \cup G)\)

8. (12 points) Find the coefficient of \(x^{12}\) in the expansion of \((x - 1)^{14}\). 
9. (12 points) The probability Maria will play softball next year is 0.9, while the probability she will play volleyball is 0.6. The probability she will play neither is 0.2. What is the probability she will play both?