Math 104 Name(PRINT!)_____

Midterm 3, April 7

1. Each of three people randomly chooses one of three calculus sections to take (A, B, or C).

(a) [10 points] What is the probability that they all choose the same one?

(b)[10 points]What is the probability that they each choose a different section?

2. Let S be a sample space and E and F events associated with S. Suppose that $\Pr(E) = 0.5$, $\Pr(F) = 0.3$, and $\Pr(E \cap F) = 0.1$.

(a)[5 points] Calculate $\Pr(E|F)$ and $\Pr(F|E)$.

(b)[5 points] Are E and F independent events? Explain.

(c) Calculate $\Pr(E|F')$.

(d) Calculate $\Pr(E'|F')$.

3. (a)[5 points] State De Morgan's Laws.

(b)[5 points] State Complement Rule.

(c)[5 points] State Inclusion-Exclusion Principle (the one for probability, not for set and counting).

(d)[5 points] Show that if events E and F are indepedent of each other, so are E' and F'.

4. (a)[5 points] State Product Rule.

(b)[5 points] Suppose that E and F are two indepedent events and $\Pr(E) = 0.3$. What is $\Pr(E|F)$?

(c)[5 points] Suppose that E and F are two identical events, namely $E = F$. What is $\Pr(E|F)$?

(d)[5 points] Suppose that F and F are two complementary events, namely $E = F'$. What is $\Pr(E|F)$?

5. Suppose that a random variable X has probability distribution given by the following table:

k	$\Pr(X = k)$
-1	0.2
0	0.3
1	0.1
2	0.4

(a)[5 points] What are the possible values of the random variable X?

(b)[5 points] What are the possible values of the random variable X^2?

(c)[5 points] Determine the probability distribution of the random variable X^2.

(d)[5 points] Draw the histogram of the probability distribution of X^2.