Practice Midterm – probability – Schneider
If you have difficulties you may email me over the weekend. Of course you can see me in office hours

1. Write down the number of possibilities in the following problems (you can leave in symbolic form with numbers in correct places)
    a. The number of different letter arrangements from **alibaba**
    b. You have seven elements in a sample space. How many different four element sets (events) are there.
    c. How many different subsets are there in a 7element sample space? (include the empty set)
    d. You have twenty people in a rowing contest. How many ways can there be three winners where there is a first, second and third place winner?
    e. Consider $(x+y)^7$. What is the coefficient of x^5y^2.
    f. How many outcomes of 7 flips of a coin have 5 heads?
2.
    a. Show that the sets A^cBC and ABC are disjoint where A^c is $\sim$A.
    b. Show that A^cB **U** AB **U** AB^c **U** A^cB^c is the whole sample space S where A and B are any subsets of S and **U** is union.
3. Self test problem Ch 2 number 6 (solution in back of book)
4. Problem 10 of regular problems in Ch 2 (hw problem).
5. Ch 2 theoretical exercise number 11 (Hint: use union formula for probabilities – and that probability of any set is <1).
6. Ch 3 Self test problem number 11.
7. Prove our theorem (from definitions of conditional probability) that if P(AB) = P(A)P(B) then $P(A|B)= P(A|B^c)$ where P(B)and $P(B^c)$ are not 0.
    a. Note:I could ask you to prove numbers of theorems we proved in our work with independence and conditional probability including independence of three events. You should be able to manipulate sets with set rules and use the definitions of conditional probability.
8. Suppose $P(H_2|H_1)=.3$ and $P(T_2|T_1)=.4$ where we are either in an H situation or a T situation (heads or tails) and the subscripts refer to the first or second trial. We also know that $P(H_1)=.5$.
    a. Let T_2 be the event of a tail on the second trial. What is $P(T_2)$.
    b. With similar notation what is $P(T_1|T_2)$