HOMEWORK #2 - DUE: Friday, Jan 25
Write your name on everything you hand in. Show your work.

1. Find the number of outcomes in the sample space in each of the following cases.

   (a) A drug for asthma is manufactured by 3 different companies in liquid, tablet and capsule form, all of which come in regular or extra strength versions. How many different varieties of drug are available for an asthma patient?

   (b) In how many different ways can a 5 question multiple choice exam with 4 choices for each of the questions be answered?

   (c) 10 people have bought 10 seats in the same row for a concert. In how many ways can they be seated?

   (d) 5 couples have bought 10 seats in the same row for a concert. If each couple is to sit together, in how many ways can they be seated?

   Note: I recommend looking at textbook exercises 2.22, 2.30, 2.35 and 2.40 to get more practice with this type of question. Don't include answers to those in your solutions though.

2. Three friends Bryce, Chris and Kate each decide to go skiing on the same day without knowing the other two are going as well. Bryce is going to decide between resorts A, B and P. Chris is going to decide between resorts A, S or P. Kate is going to decide between resorts S or A. All possible outcomes are equally likely.

   (a) Draw the tree diagram showing all possible outcomes for the day (the sample space).

   (b) What is the probability that at least two of them decide to go the same resort?

   (c) What is the probability that all three friends end up going to three different resorts?

   Now a fourth friend, Michael, decides to go skiing on the same day as well. He is going to decide between resorts C, D, A or S. Answer the following based on the four friends going skiing.

   (d) How many possible outcomes are there now? Answer without drawing a tree.

3. There is a deck of 25 cards numbered 1 through 25. You draw 5 cards without replacement (you don't put the cards you draw back in the deck), and lay them on the table from left to right in the order they are drawn.

   (a) How many possible outcomes are there?

   (b) What is the probability that the leftmost card will be 10 and the rightmost card will be number 17?

   (c) What is the probability that the cards 10 and 17 will be on the table?

4. Six students (Dave, Michael, Ann, Joe, Jane, Bill) are attending a lecture in a classroom with 10 seats. The seats are in a single row as follows

A	B	C	D	E	F	G	H	I	J

All valid seating arrangements are equally likely. By valid seating arrangement we mean that all students have to sit down in a seat and students can not share seats. Here is an example of a valid seating arrangement:

Dave - B, Michael - A, Ann - E, Joe - I, Jane - H, Bill - F

- (a) How many seating arrangements are there? Note that who sits where matters.
- (b) What is the probability of the seating arrangement
  Dave - A, Michael - C, Ann - D, Joe - H, Jane - I, Bill - J?
- (c) What is the probability that Dave sits in seat A?
- (d) What is the probability that seats A, C, D, H, I and J are occupied?
- (e) What is the probability that seat A is occupied?
- (f) What is the probability that Dave sits in A and Michael sits in C or Dave sits in A and Bill sits in F?

5. User IDs on an old computer system consist of 4 letter sequences from the first 8 letters of the English alphabet: a, b, c, d, e, f, g, h. Note that the same letter can be used any number of times in the 4 letter sequence. When a new user first registers, an ID is randomly generated (all outcomes equally likely) with the only condition that it is different from the IDs of all previously registered users.

- (a) How many different IDs are possible for the first registered user?
- (b) What is the probability that the ID for the first registered user will start with the letter c and end with the letter g?
- (c) How many different IDs are possible for the second registered user?
- (d) Jack, Kate and Sawyer are the only three users of this system. In how many different possible ways can they be assigned IDs?

  For instance, one possible way is: Jack's ID = "chhe", Kate's ID = "defa", Sawyer's ID = "bgcg".