MAT 114 Probability Worksheet

This worksheet focuses on the computations of Sections 2B and 2C.
It is not 'due'; it is to give you practice.
A solution key will be provided.

1. All that remains of a bridge mix are 6 soft centers (3 mint creams, 2 orange creams and 1 lemon cream) and 4 hard centers (3 toffees and 1 nut).

    a. Suppose that one is chosen at random. What is the probability that

        i. It is a mint cream?
        ii. It is a nut?
        iii. It is a mint given that it is a soft center?
        iv. It is a nut given that it is a soft center?

    b. Are the following events independent?

        i. mint and soft center?
        ii. nut and soft center?

    c. Suppose that one is chosen at random, and that a second is later chosen at random without the first being replaced. What is the probability of getting

        i. an orange cream followed by an orange cream?
        ii. a lemon cream followed by a lemon cream?
        iii. a hard center followed by a hard center?

    d. Suppose that one is chosen at random, identified and then put back into the bag. Suppose a second is then chosen at random. What is the probability of getting

        i. an orange cream followed by an orange cream?
        ii. a lemon cream followed by a lemon cream?
        iii. a hard center followed by a hard center?

2. All that remains of a deck of cards are the 2, 3, 5, 7, 8 and J of diamonds; the 3 and 7 of hearts, the 5, Q and K if spades and the J of clubs. (12 cards in all.)

    a. Suppose that one is chosen at random. What is the probability that

        i. It is a diamond?
        ii. It is a 7?
        iii. It is a diamond given that it is a 7?
        iv. It is an 8 given that it is red?

    b. Are the following events independent?

        i. diamond and 7?
        ii. 8 and red?

c. Suppose that one is chosen at random, and that a second is later chosen at random without the first being replaced. What is the probability of getting

   i. a 3 followed by a Q?
   ii. a red followed by a red?
   iii. a club followed by a club?

d. Suppose that one is chosen at random, identified and then put back into the bag. Suppose a second is then chosen at random. What is the probability of getting

   i. a 3 followed by a Q?
   ii. a red followed by a red?
   iii. a club followed by a club?

3. One hundred students from three residence halls were surveyed as to their favorite subject. The results obtained are given in the following table:

	Allen	Wilson	Sechrist	Total
Math	1	0	2	3
English	12	11	10	33
Psychology	21	15	28	64

Suppose one of the surveyed students is selected at random.

a) What is the probability that he/she is from Allen?
b) What is the probability his/her favorite subject is English?
c) What is the probability his/her favorite subject is English given that he/she is from Allen?
d) What is the probability that he/she is from Allen given that his/her favorite subject is English?
e) Are the events "from Allen" and "favorite subject is English" independent?

4. a) A weather report describes conditions as "clear", "partly cloudy" or "overcast". What is the probability that Sometown will be described as "clear" tomorrow?

   b) The probability that Flagstaff will be "clear" tomorrow is 0.8. What are the odds in favor of clear skies?

   c) The odds against clear skies in Houghton, Michigan tomorrow are 5:1. What is the probability of clear skies in Houghton tomorrow?

5. a) The probability that anyone will get this problem right is 1/20. What are the odds against someone getting the problem right? [Please forgive my lousy sense of humor.]

   b) The odds in favor of someone smiling at my lousy sense of humor are 1:4. What is the probability of someone smiling at it?

6. The peoples of the planet Ixx use an alphabet that only has 5 letters. [Seriously; I am not kidding, they really do!]

    a. How many 5 letter words are possible with this alphabet? (Assume that all possibilities give a word)

    b. How many 5 letter words are possible in which no letters are repeated?

    c. If a 5-letter word is chosen at random, what is the probability that it has no repeated letter?

7. The Lamb and Anchor has a lunch menu that offers 6 entrees and 3 desserts.

    a. How many "meals" (i.e. one entrée and one dessert) are there?

    b. If the entrees are labeled A, B, C, D, E and F and Ollie, Wally and Polly never have the same entrée twice in a week

        i. In how many ways can Ollie select his 5 entrées for a given week?
        ii. In how many ways can Wally select his 5 entrées for a given week if he always picks C on a Monday?
        iii. In how many ways can Polly select her 5 entrées for a given week given that she doesn't like D?

8. Molly likes to take a candy bar to work each day. Suppose that there are 12 different kinds of candy bar, and Molly never has the same twice in a given (5-day) week.

    a. In how many ways can Molly select the 5 candy bars at the grocery store at the weekend?

    b. If Molly buys each candy bar at a convenience store en route to work, in how many ways can she purchase the 5 candy bars. [Note that here, Twix on Monday, Mars on Tuesday is different to Mars on Monday, Twix on Tuesday.]