Math 166 - Spring 2008
Week-in-Review #6
Exam 2 Review

courtesy: Kendra Kilmer

(covering Sections 6.3-6.4, 7.1-7.6)

1. A survey is done of student's participation in activities at Parent's Weekend. The results are shown below:

	Attended Midnight Yell	Did not attend Midnight Yell	Total
Attended Variety Show	350	260	610
Did not attend Variety Show	240	80	320
Total	590	340	930

   (a) What is the probability that a student attended the Variety Show?

   (b) What is the probability that a student attended only Midnight Yell?

   (c) Given that a student attended Midnight Yell, what is the probability that the student did not attend the Variety Show?

   (d) What is the probability that a student who attended the Variety Show also attended Midnight Yell?

2. If two fair six-sided dice are rolled, what is the probability that the sum is 8 given that the sum is greater than 7?

3. A survey has shown that 95% of the women in a certain community work outside the home. Of these women, 56% are married, while 85% of the women who do not work outside the home are married. Find the probabilities that a woman in the community can be categorized as follows:

   (a) A single woman working outside the home.

   (b) Married.

4. On a typical spring day in College Station the probability of rain is 0.35, the probability of a traffic jam is 0.24, and the probability of rain or a traffic jam is 0.45. Are the events "it rains" and "a traffic jam occurs" independent?

5. In a home theater system, the probability that the video component needs repair within 1 year is 0.02, the probability that the electronic component needs repair within 1 year is 0.03, and the probability that the audio component needs repair within 1 year is 0.01. Assuming the probabilities are independent, what is the probability that exactly two components will need repair within 1 year.

6. Unfortunately, two lights have been added to Mrs. Kilmer's commute to work. After a few weeks of collecting data, she has determined that the probability that she will be stopped by the light at 2818 and Holleman is 0.2857 whereas the probability that she will be stopped by the light at 2818 and Luther is 0.0476. Assuming these events are independent, what is the probability that she will be stopped by at least one of the two lights on her drive to work tomorrow morning?

7. A crate contains 8 basketballs and 5 footballs. A bag contains 6 basketballs and 9 footballs. An experiment consists of selecting a ball at random from the crate and placing it in the bag. A ball is then randomly selected from the bag. If a football is selected from the bag, what is the probability that the transferred ball was a football?

8. The probability that a person with certain symptoms has a disease is 0.8. The blood test used to confirm this diagnosis gives positive results for 90% of people with the disease and 5% of those without the disease. What is the probability that an individual who has the symptoms and who reacts positively to the test actually has the disease?

9. How many three digit numbers can be formed from the digits 1, 3, 4, 5, 6, 9 if the numbers formed must all be even and no digit can be repeated?

10. Susie has five different pieces of fruit, eight different vegetables, and seven different cookies. If she is going to pack a lunch that contains five items, how many ways can she have exactly two pieces of fruit or exactly two cookies?

11. Sarah is trying to arrange 5 identical blue candle sticks, 7 identical red candle sticks, and 3 identical green candle sticks on her shelf. How many distinguishable arrangements are possible?

12. An experiment consists of selecting 2 coins (without replacement) from a bowl containing a penny, a nickel, a dime, and a quarter. (Note: We are only observing which coins we select. The order we select them in does not matter.)

   (a) Give the sample space for this experiment.

   (b) Find the event E where E is the event that the sum of the coins is greater than \$0.11.

   (c) Find the probability of the event E.

13. For two events, E and F, we know the $P(E\cap F^c) = 0.2$, $P(F) = 0.5$, and $P(E\cap F) = 0.4$. Find $P((E\cap F^c)\cup(E^c\cap F))$.

14. Sue lives in a house divided. That is, her mom is an Aggie and her dad is a Longhorn. She is packing her bag to go to Austin for the football game. Her drawer contains twelve Aggie shirts and nine longhorn shirts. In packing her bag, she randomly selects five shirts.

   (a) What is the probability that she packs exactly two Aggie shirts?

   (b) What is the probability that the second shirt she packs is an Aggie shirt if the first shirt is a longhorn shirt?

15. An accounting firm employs 20 accountants, of whom 8 are CPAs. If a delegation of 7 accountants is randomly selected from the firm to attend a conference, what is the probability that at least 2 CPAs will be selected?

16. A box contains five red marbles and 18 green marbles. An experiment consists of randomly selecting a sample of 4 marbles out of the box and observing the number of red marbles in the sample. Find the probability distribution for this experiment.

17. Determine whether each statement is true or false.

   (a) Given any two events A and B, $P(A\cap B) = P(A)\cdot P(B)$.

   (b) The numbers 1, 2, and 3 are written separately on 3 pieces of paper. An experiment consists of drawing two slips from the bowl and observing the numbers. This experiment has 3 events. (Note: The order in which the numbers are selected is not observed.)

   (c) An experiment consists of casting two fair dice and recording the sum of the numbers appearing uppermost. The sample space for this experiment has equally likely outcomes.

   (d) The sample space associated with an experiment is given by $S = \{a,b,c,d,e\}$. The events $E = \{a,b\}$ and $F = \{c,d\}$ are mutually exclusive. Hence the events E^c and F^c are mutually exclusive.