1. A group of 7 education majors, 12 art majors, 5 sociology majors, 8 math majors, and 3 engineering majors must select a committee of five. How many committees are possible if the committee must contain:

   a) one person from each major
   b) any mixture of the majors
   c) exactly 3 art majors
   d) at most 2 sociology majors

2. You go to buy a house from a new neighborhood where the houses are ordered from a catalog. For your house you have to decide between 13 different exterior colors, 4 entryways, 7 floor plans, 3 layouts for the backyard and whether or not you want a garage. How many different houses do you have to choose from?

3. Shade the appropriate region of a Venn Diagram.

   a) $A' \cup B$  
   b) $A' \cap B'$

4. A group of 90 freshman, of which 50 are men, are choosing a 4 person committee:

   a. How many combinations can they have with 3 women?
   b. How many combinations can they have with at most 2 women?
   c. How many combinations can they have with at least 3 men?

5. How many five card poker hands are possible with 4 kings?

6. Let $U= \{1,3,4,6,8,10,14\}$ and $A= \{1,3,6,10\}$ and $B= \{1,4,6,8,10\}$. List each set.

   $B' =$

   $A' \cap B =$

   $A \cup B' =$

   $A' =$

7. The CEO of a small company is picking 3 random people to form a committee and scout out the location of a new office building.

   a. If there are 68 people in the company, how many different arrangements of committees can there be?
   b. If the first person chosen is the chair, the second is the assistant chair and the last person chosen is the representative, how many different arrangements of committees could there be?

8. A survey of 816 of Danelle’s former math students asked whether they had seen the movie “Princess Bride” or if they had seen the movie “Clerks”. The following information was obtained: 387 had seen neither movie and 226 had seen “Princess Bride”. Also, 92 of the “Princess Bride” viewers had not seen “Clerks”. Draw a Venn Diagram and answer the following:

   a. How many students saw both movies?
   b. How many students saw “Princess Bride” or “Clerks”
   c. How many students saw “Clerks”
   d. How many have seen “Clerks” but not “Princess Bride”