Math 164
Fall, 2009 Name: **Solutions**
Quiz 10 - §§11.1, 11.2

For each of the following problems circle T if the given statement is always true and F if the statement is sometimes false. There is no partial credit on this part of the quiz.

1. T F For any counting numbers n and m, $(n-m)! = n! - m!$.

   This is false. Think, for instance, about $m = 5$ and $n = 3$. Then the left side is
   $$(5-3)! = 2! = 2$$
   and the right side is
   $$5! - 3! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 - 3 \cdot 2 \cdot 1$$
   which is not 2.

2. T F For any counting number n, $n! = n(n-1)!$.

   This is true.

   Complete the following problems. Show all work and explain your reasoning.

3. Find the number of "words" that can be formed using all of the letters in HEEBIE-JEEBIES.

   There are 13 letters, so there are 13! ways to rearrange the letters, but we have to divide by the number of ways that letters can repeat. Notice that there are 6 E's, 2 B's and 2 I's. Therefore, we have
   $$\frac{13!}{6!2!2!}$$
   ways to rearrange the letters.

4. There is a club with members Alan, Bill, Cathy, David and Evelyn.

   (a) Use the list method to determine how many ways there are to choose two members to decorate for a party.

   Here are the ways to pick 2 people. There are a total of 10 ways to do this.
   AB
   AC
   AD
   AE
   BC
   BD
   BE
   CD
   CE
   DE
   Notice that order does not matter here since choosing David and Evelyn, for instance, is the same as choosing Evelyn and David.

(b) Find the number of ways in which you can schedule one member to work in the office on each of five different days, assuming members may work more than one day.

We will use fundamental counting principle, picking a person to work each day, allowing repeats. So there are

$$5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 = 5^5$$

ways to do this.