Combinatorics

1 Books and Words

1. There are 5 books on a shelf. How many ways are there to arrange three of them in a stack on the floor?

2. How many ways are there to arrange the letters in the word "PART"? For example, one arrangement is APRT. (How many of these form a real word in the English language?!)

3. How many ways are there to arrange the letters in the word "SWEET"?

4. How many ways are there to arrange the letters in the word "CHEESE"?

   Extra problem:

5. Dad has two apples, three pears, and four oranges. He will pick one piece of fruit in his son's lunch box for 9 consecutive days. How many ways are there to do this?

2   After School

1. You stop by the ice cream shop on the way home from school.

   (a) There are 10 flavors of ice cream available. How many ways are there to make a triple scoop ice cream cone with three different flavors, where the order of the flavors matters?

   (b) How many ways are there to make a milkshake with one scoop each of three different flavors of ice cream?

   (c) *What if repetition of flavors is allowed in parts (a) and (b).

2. When you get home after the ice cream, you are greeted by your 4 dogs (Rover, Spot, Daisy, and Killer). In how many ways can you choose one or more of them to accompany you on a walk around the park?

Extra Problems

3. That evening, you go to dance class. There are 4 boys and 4 girls in the class (including you).

   (a) How many ways are there to arrange them in pairs if each pair must be one boy and one girl?

   (b) How many ways are there to arrange them in pairs if girls will only dance with other girls and boys with other boys?

   (c) *How many ways are there to arrange all in pairs if anyone can dance with anyone?