Solution to HW 9

(1) (12.1 Problem 22) A standard deck contains 52 different cards. In how many ways can you select 5 cards from the deck?
Solution: The order of the card is not important. So the answer is $C(52,5) = \frac{52!}{5!(52-5)!} = \frac{52!}{5!47!} = \frac{52\cdot51\cdot50\cdot49\cdot48}{5\cdot4\cdot3\cdot2\cdot1}$

(2) (12.1 Problem 26) Suppose you want to plant a flower bed with four different plants. You can choose from among 8 plants How many different choices do you have?
Solution: The order of the flower is not important. So the answer is $C(8,4) = \frac{8!}{5!(8-4)!} = \frac{8!}{4!4!} = \frac{8\cdot7\cdot6\cdot5}{4\cdot3\cdot2\cdot1} = 2\cdot7\cdot5 = 70$

(3) (12.1 Problem 14) A committee of 3 people must be chosen from a group of 10. The committee consists of a president, a vice president and a treasure. How many committees can be selected?
Solution:There are 10 ways to choose the president, 9 ways to choose the vice president and 8 ways to choose the treasure. So the answer is $10\cdot9\cdot8 = 720$.

(4) (12.1 Problem 18) An amino acid is encoded by triplet nucleotides (three nucleotides). How many different amino acids are possible if there are 4 different nucleotides that can be chosen for a triple?
Solution: There are 4 possible choices for each nucleotides. The answer is $4\cdot4\cdot4 = 64$.

(5) (12.1 Problem 16) You have just enough time to play 4 different songs out of 10 from your favorite CD. In how many ways can you program your CD player to play the 4 songs?
Solution: The order of the song is important. So the answer is $P(10,4) = \frac{10!}{(10-4)!} = \frac{10!}{6!} = 10\cdot9\cdot8\cdot7$.

(6) (12.1 Problem 2) Suppose that you want to investigate the effects of leaf damage on the performance of drought-stressed plants. You plan to use 3 levels of leaf damage and 4 different watering protocol, you plan to to have 3 replicates. What is the total number of replicates?
Solution: The answer is $3\cdot4\cdot3 = 36$

(7) (12.1 Problem 30) Twelve children are divided up into three groups, of 5, 4 and 3 children, respectively. In how many ways can this be done if the order within each group is not important?
Solution:The order of the children is not important. So the answer is $\frac{12!}{5!4!3!}$.