

Chapter 10: Permutations, Combinations & Probability (IC)

1. A student downloaded five music files to his portable MP3 player. In how many different orders can the songs be played?

$5P_5 = 120$      5 · 4 · 3 · 2 · 1

2. A student must read three of seven books for an English class. How many different selections can the student make?

$7C_3 = 35$      \* order not important

3. A football league consists of six teams. How many games must be scheduled if each team must play each other team twice?

$6C_2 = 15 \times 2 = 30$      (5 + 4 + 3 + 2 + 1) \* 2

4. How many different letter arrangements are possible using all the letters of the word calculus?

$\frac{8!}{2!2!2!} = 5,040$

5. If six black, five red, four white, and two green disks are to be arranged in a row, what is the number of possible color arrangements?

$\frac{17!}{6!5!4!2!} = 85,765,680$

6. Find the probability that the coins will match if (a) two boys each toss a coin (b) three boys each toss a coin

{ HT, HH, TT, TH } (a)  $\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$      (b) { HHH, THH, HTH, HHT, TTH, HTT, THT, TTT }  
 $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$

7. Fifteen people decide to form a bowling league. In how many ways can the 15 people be divided into three teams of five people each?

$15C_5 \cdot 10C_5 \cdot 5C_5 = 756,756$

8. If 1000 tickets are sold for a raffle, find the probability of winning if an individual purchases (a) 1 ticket (b) 10 tickets (c) 50 tickets

$\frac{1}{1000}$       $\frac{10}{1000} = \frac{1}{100}$       $\frac{50}{1000} = \frac{1}{20}$

9. A quiz consists of six true-or-false questions: at least four correct answers are required for a passing grade. If a student guesses at each answer, what is the probability of (a) passing (b) failing

(a)  $\frac{C(6,4) + C(6,5) + C(6,6)}{2^6} = \frac{22}{64} = \frac{11}{32}$      (b)  $1 - \frac{22}{64} = \frac{42}{64} = \frac{21}{32}$

10. The "get-out-the-vote" committee of a political action group has 12 members. In how many ways can the 12 members be divided into groups of two people?

$12C_2 \cdot 10C_2 \cdot 8C_2 \cdot 6C_2 \cdot 4C_2 \cdot 2C_2 = 7,484,400$