

Counting: Permutations & Combinations

1. Decide whether each object is a permutation or a combination.
 - (a) A hand of cards in poker. **Combination**
 - (b) The "combination" on a locker combination lock. **Permutation**
 - (c) A license plate. **Permutation**
 - (d) A telephone number. **Permutation**
 - (e) Set of courses you are taking during a semester. **Combination**
2. First, second, and third prizes are to be awarded to three different people. If there are 11 possible candidates, how many outcomes are possible? **990**
3. How many counting numbers have four distinct nonzero digits such that the sum of the four digits is 10? What if the sum of the four digits is 11? **24**
4. Evaluate the following expressions.
 - (a) ${}_{10}C_4$ **210**
 - (b) ${}_5C_0$ **1**
 - (c) ${}_7P_6$ **1260**
 - (d) ${}_7P_1$ **7**
 - (e) ${}_8C_5$ **56**
 - (f) ${}_8C_3$ **56**
 - (g) ${}_6P_6$ **180**

5. Consider a game of 5-card poker played with a standard 52-card deck. Determine the number of possible outcomes favorable to each event. **Solutions in book**

(a) A Royal flush (A,K,Q,J,10, all the same suit)

(b) Straight flush (5 cards of consecutive denominations, all in the same suit)

(c) Four of a kind

(d) Full house

(e) Flush

(f) Straight

(g) Three of a kind

(h) Two pairs

(i) One pair

(j) No pairs