Section 7 Assignment (84 points) – Counting

To receive credit, you must either show your work on the worksheet or explain how you got the answer.

1. (5 points) Your zyBook password consists of 3 upper-case letters followed by 4 lower-case letters followed by seven digits. How many different passwords are possible? *(Note: leave answer in exponent or factorial form)*

   $26^3 * 26^4 * 10^7$

2. (15 points) If the password can contain upper/lower case letters, digits, or any of eight special symbols: *(Note: leave answers in exponent or simplified factorial form)*

   a. (5 pts) How many different 8-character passwords are possible?

      70^8

   a. (5 pts) How many passwords 9, 10, or 11-character passwords are possible?

      $70^9 + 70^{10} + 70^{11}$

   b. (5 pts) How many different 8-character passwords are possible if characters cannot be repeated?

      $= 70! / 62!$

      $= 380,634,949,094,400$

3. (12 points) Compute each of the following: *(Note: to make your life [and programs] easier, simplify factorial fractions before! calculating answer)*

   $= 11!$

   $= 39,916,800$

   a. (3 pts) P(11, 1) **- no repeats**

      $= 11! / 10!$

      $= 11$

b. (3 pts) P(n, n-3) **- no repeats** *(Note: leave in simplified factorial form)*

$= n! / 3!$

c. (3 pts) P(15, 7) – **repeats allowed**

$= 15^7$

$= 170{,}859{,}375$

4. (14 points) Compute each of the following: *(Note: to make your life [and programs] easier, simplify factorial fractions before! calculating answer)*

   a. (3 pts) C(11, 2) **- no repeats**

   $= 55$

   b. (3 pts) C(7, 7) **- no repeats**

   $= 1$

   c. (4 pts) C(n+2, n-1) - no repeats (Note: leave in simplified factorial form)

   $= (n+2)! / (n-1)!3!$

   d. (4 pts) C(5, 3) **- repeats allowed**

   $= 35$

5. (10 points) Find the number of permutations of A taken r at a time

   a. (5 pts) if repetition is allowed: A = (1, 2, 3, 4, 5, 6, 7, 8), r = 5

   $= 32{,}768$

   b. (5 pts) if repetition is NOT allowed: A = (1, 2, 3, 4, 5, 6, 7, 8), r = 5

   $= 6{,}720$

6. (12 points) If there are three routes from Ogden to Salt Lake, four routes from Salt Lake to Park City, and two routes from Ogden to Park City:

   a. (4 pts) How many ways are there to travel from Ogden to Park City?

   = 14

   b. (4 pts) How many ways are there to travel from Salt Lake to Ogden?

   = 11

7. (20 points) Your ice tray contains 12 green cubes and 6 pink cubes.

   a. (6 pts) How many ways can we select 7 cubes?

   = 31,824

   b. (6 pts) How many ways can 5 cubes be selected so that all 5 are pink?

   = 6

c. (8 pts) How many ways can we select 4 cubes so they are not all green or all pink?

2550