ICS 6D **Due: Friday, June 5, 2015, 2:00PM**

Homework 9

Instructor: Sandy Irani Section 9.6, June 1 Reading

Leave your answer for the questions below as an arithmetic expression, including the $P(n,k)$ or $\binom{n}{k}$ notation. You do not have to compute a final numeric value.

1. What is the coefficient of x^3y^4 in $(-3x+4y)^7$?
2. What is the coefficient of x^2y^7 in $(5x-y)^9$?
3. What is the coefficient of x^5y^3 in $(3x-4y)^8$?
4. What is the coefficient of x^6y^3 in $(-2x+5y)^9$?
5. Use the Binomial Theorem to find the closed form for the following sums. Recall that a closed form is an expression without a summation.
   (a) $\sum_{k=0}^{n}\binom{n}{k}3^k(-1)^{n-k}$.
   (b) $\sum_{k=0}^{n}\binom{n}{k}2^k$.
6. The 6^{th} row of Pascal's triangle is $1,6,15,20,15,6,1$.
   (a) What is the 7^{th} row of Pascal's triangle?
   (b) Use your answer to the previous part to write the expanded form of $(x+y)^7$.
7. Write the following 5-tuples in increasing lexicographic order:

$(3,100,101,3,4)$	$(1,1,2,1,2)$	$(3,4,5,1,1)$
$(1,2,100,1,1)$	$(3,4,5,2,2)$	$(2,101,100,3,4)$
$(2,100,101,3,4)$	$(3,4,5,2,1)$	$(1,1,2,2,1)$

8. For each permutation of $\{1,2,3,4,5,6,7\}$, give the next largest permutation in lexocigraphic order:
   (a) $(1,2,3,4,5,6,7)$
   (b) $(7,6,5,3,4,2,1)$
   (c) $(1,7,6,4,2,3,5)$
   (d) $(3,7,6,5,4,2,1)$
   (e) $(5,4,7,6,3,2,1)$
9. Write the permutations of $\{1,2,3\}$ in lexicographic order.
10. For each 7-subset of $\{1,2,3,4,5,6,7,8,9,10,11,12,13,14\}$, give the next largest 7-subset in lexocigraphic order:
    (a) $\{1,2,3,4,5,6,7\}$
    (b) $\{2,4,5,9,11,12,13\}$
    (c) $\{2,4,5,11,12,13,14\}$
    (d) $\{2,4,5,6,11,12,14\}$
    (e) $\{7,8,10,11,12,13,14\}$
11. Write the 3-subsets of $\{1,2,3,4,5,6\}$ in lexicographic order.