Math 228 **(Bonus) Homework 9** Due: Wed April 11, 2012

**Instructions**: This homework is optional, but strongly suggested. Complete the homework problems below on a *separate* sheet of paper (and not all jammed up between the questions). Each solution should be accompanied with supporting work or an explanation why the solution is correct. Your work will be graded on correctness as well as the clarity of your explanations.

1. The Grinch sneaks into a room with 6 Christmas presents to 6 different people. He proceeds to switch the name-labels on the presents. How many ways could he do this if:

(2pts) (a) No present is allowed to end up with its original label?

(2pts) (b) Exactly 2 presents keep their original labels?

(1pts) (c) Exactly 5 presents keep their original labels?

2. After a late night of math studying, you and your friends decide to go to your favorite tax-free fast food Mexican restaurant, *Burrito Chime*. You decide to order off of the dollar menu, which has 7 items. Your group has \$16 to spend (and will spend all of it).

(1pts) (a) How many different orders are possible? (The *order* in which the order is place does not matter - just which and how many of each item that is ordered.)

(1pts) (b) How many different orders are possible if you want to get at least one of each item?

(3pts) (c) How many different orders are possible if you don't get more than 4 of any one item? Hint: this is tricky - get rid of the bad orders using PIE.