

# CMSC 250 Homework 12 Fall 2005 0201 & 0202

Due Wed Nov 30 at the beginning of your discussion section.

Even though this is due after Thanksgiving Break, the material is on the second midterm exam.

**You must write the solutions to the problems single-sided on your own lined paper, with all sheets stapled together, and with all answers written in sequential order or you will lose points.**

The answer only needs to be taken to a form that includes only addition, subtraction, multiplication, division, factorials, and exponents. You do not need to evaluate those to a number. Subparts of questions never affect the other subparts.

1. How many ways can 10 (identical) dimes be distributed among five children if
  - (a) there are no restrictions?
  - (b) each child gets at least one dime?
  - (c) the oldest child gets at least two dimes?
  - (d) the oldest child gets exactly two dimes?
2. A certain ice cream stor has 31 flavors of ice cream available. In how many ways can we order a dozen ice cream cones if
  - (a) we do not want the same flavor more than once?
  - (b) an individual flavor may be ordered as many as 12 times?
  - (c) an individual flavor may be ordered as many as 11 times?
3. Columba has two dozen each of  $n$  different colored beads. If she can select 20 beads (with repetition of color allowed) in 230,230 ways, what is the value of  $n$ ?
4. Answer the following in the specifics of part a, and then generalize for part b.
  - (a) In how many ways can we select five coins from a collection of 10 consisting of one penny, one nickel, one dime, one quarter, one half-dollar and five (identical) Susan B. Anthony dollars?
  - (b) In how many ways can we select  $n$  objects from a collection of size  $2n$  that consists of  $n$  distinct and  $n$  identical objects?
5. Determine the number of integer solutions of  $x_1 + x_2 + x_3 + x_4 = 32$  where
  - (a)  $x_i \geq 0$  for  $1 \leq i \leq 4$
  - (b)  $x_i > 0$  for  $1 \leq i \leq 4$
  - (c)  $x_1, x_2 \geq 5$  and  $x_3, x_4 \geq 7$
  - (d)  $x_1, x_2, x_3 > 0$  and  $0 < x_4 \leq 25$