

Worksheet #16; date: 10/22/2018
MATH 55 Discrete Mathematics

1. What are the numbers of way to put 42 balls into 5 bins if
 - (a) the balls are identical but the bins are not?
 - (b) the bins are identical but the balls are not?
 - (c) the balls and the bins are all identical?
 - (d) the balls and the bins are all distinct from each other?
2. (*Rosen 6.5.9e, f*) A bagel shop has onion bagels, poppy seed bagels, egg bagels, salty bagels, pumpernickel bagels. How many ways are there to choose
 - (a) a dozen bagels with at least one of each kind?
 - (b) a dozen bagels with at least three egg bagels and no more than two salty bagels?
3. (*Rosen 6.5.16b, c*) How many solutions are there to the equation

$$x_1 + x_2 + x_3 + x_4 + x_5 + x_6 = 29,$$

where x_i , $i = 1, 2, 3, 4, 5, 6$, is a nonnegative integer such that

- (a) $x_1 \leq 5$?
 - (b) $x_1 > 8$ and $x_2 > 8$?
4. (*Rosen 6.5.39*) How many ways are there to travel in xyz -space from the origin $(0, 0, 0)$ to the point $(4, 3, 5)$ by taking steps one unit in the positive x direction, one unit in the positive y direction, or one unit in the positive z direction? (Moving in the negative x -, y - or z -direction is prohibited so that no backtracking is allowed.)