SDS 321 Worksheet 6 (Counting and Probability)

1. A supermarket stocks 10 varieties of soup, which we will label S_1, S_2,…, S_{10}. Each week, Ann chooses 5 cans of soup to feed her family. Since it would be boring to choose the same set of 5 varieties each week, she chooses a different set (i.e. a different combination) on each occasion. For how many weeks can she do this, before she runs out of different combinations to choose?

2. How many solutions are there to the equation x1 + x2 + x3 + x4 = 17, where x1, x2, x3, x4 are non-negative integers?

3. How many different ways are there to choose a dozen donuts from the 21 varieties at a donut shop?

4. A bookshelf has three shelves: the top, middle and lower shelf. How many ways are there to place 15 books on the three shelves if each shelf must have at least one book?