Unit 1 - Combinatorics - Basic Methods
Week 1 - Permutations and the Symmetric Group

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1

AC 2.9.7
How many strings are there of the form $l_1l_2d_1d_2d_3l_3d_4l_4l_5l_6$ are there where

- Each l_i is an uppercase letter from the english alphabet
- Each d_i is a decimal digit
- l_2 is not a vowel, $\{A, E, I, O, U\}$
- All the numerical digits are different

2

AC 2.9.11
A donut shop sells 12 types of donuts. A manager wants to buy 6 donuts, one for himself and each of his 5 employees.

1. How many ways can he do this, specifing who gets what with no other restrictions?
2. How many ways if he refuses to get two of the same donut?
3. What if he doesn't specify who gets what and simply orders 6 different types of donuts and puts them in the breakroom?

3

I have 20 mathematics books, 13 physics books, 8 chemistry books, and 9 computer science books. However the book shelf in my office only holds 25 books. In how many ways can I arrange 10 mathematics books, 7 physics books, 3 chemistry books, and 5 computer science books on the shelf if all books of a given subject are grouped together? You may utilize approriate notation when formulationg your solution.