Tutorial 10

CSCI2110/MATH2080: Discrete Mathematics

6.5 - Generalized Permutations and Combinations
7.1 - An Introduction to Discrete Probability
7.2 - Probability Theory
7.3 - Bayes' Theorem

Benjamin Fedoruk

Ontario Tech University

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(Rosen 57/351)

1. How many different strings can be made from the word PEPPERCORN when all letters are used?

2. How many of these strings start and end with the letter P?

3. In how many of these strings are three letter Ps consecutive?

(Rosen 5/466) For each integer less than 100 determine whether $\binom{2n}{n}$ is divisible by 3. Can you formulate a conjecture that tells us for which integers n, $3|\binom{2n}{n}$ based on the digits in the base three expansion of n?

(Rosen 31/444) Prove the **hockeystick identity** (a) combinatorially and (b) using Pascal's identity.

Let n and r be positive integers. Then,

$$\sum_{k=0}^{r} \binom{n+k}{k} = \binom{n+r+1}{r}$$