8-6 Counting Principles

Day 1

The Fundamental Counting Principle: E_1 and E_2 are two events. E_1 can occur in m_1 different ways while E_2 can occur in m_2 different ways. The number of ways that the two ways can occur is m^1 times m^2.

Ex 1) How many different pairs of letters from the English Alphabet are possible?

$26 \cdot 26 = 676$ ways (1st letter)

Ex 2) How many different telephone numbers are possible in the 920 area code (a local number cannot begin with a 0 or 1)?

$(920)\ 8 \cdot 10 \cdot 10 - 10 \cdot 10 \cdot 10 \cdot 10$

$= 8{,}000{,}000$

Ex 3) A consumer can choose one of four amplifiers, one of six compact disc players, and one of five speaker models for an entertainment system. Determine the number of possible system configurations.

$4 \cdot 6 \cdot 5 = 120$

Ex 4) Four people are lining up for a ride on a toboggan, but only two of the four are willing to take the first position. With that constraint, in how many ways can the four people be seated on the toboggan?

$2 \cdot 3 \cdot 2 \cdot 1 = 12$

Ex 5) In how many ways can five children line up in a row?

$5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$

$5!$

Permutations...more coming tomorrow but today you will learn the formula and how to do it on your calculator.

$$ {}_nP_r = \frac{n!}{(n-r)!} $$

Ex 6) ${}_8P_3$ =