

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?

$$\begin{array}{c} \rightarrow 26 \\ \text{1st letter} \end{array} \cdot \underline{26} = 676 \text{ ways}$$

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

$$(920) \underline{8} \cdot \underline{10} \cdot \underline{10} - \underline{10} \cdot \underline{10} \cdot \underline{10} \cdot \underline{10} \\ = 8,000,000$$

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.

$$\underline{4} \cdot \underline{6} \cdot \underline{5} = 120$$

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?

$$\underline{2} \cdot \underline{3} \cdot \underline{2} \cdot \underline{1} = 12$$

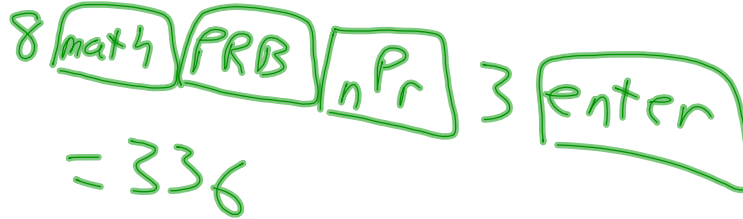
Ex 5) In how many ways can five children line up in a row?

$$\underline{5} \cdot \underline{4} \cdot \underline{3} \cdot \underline{2} \cdot \underline{1} = 120 \\ 5!$$

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

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

Ex 6) ${}_8 P_3 =$



Handwritten calculator steps for ${}_8 P_3$:

8 math PRB ${}_n P_r$ 3 enter

= 336