Precalculus

10-07 Counting Principles

Fundamental Counting Principle

- If events E_1 and E_2 occur in m_1 and m_2 ways, the number of ways _____ events can occur is _____.

A lock will open with the right choice of 3 numbers. How many different sets of 3 numbers can you choose if each number is from 1 to 30 inclusive? (a) with repetition (b) without repetition

How many license plates can be made if each is 2 letters follow by 4-digits? (a) with repetition (b) without repetition

Permutation

- Number of ways to _____ n objects taken r at a time

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

How many ways can 8 children line up in a row?

A club has 24 members, how many ways can 5 officers be selected?

Distinguishable Permutations

- We want the orders that look _____ (choosing _____ the objects)

$$\frac{n!}{q_1! \cdot q_2! \cdot q_3! \cdots}$$

- Where n = number of objects; q = how many times each is repeated

How many distinguishable ways to order the letters in BANANA?

Combinations

- Grouping of objects _____order

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

There are 31 students. How many different groups of 4 can be made?

You are forming a 10-person committee from 9 women and 12 men. How many different committees if 5 women and 5 men?