

Math 155 - Day #18: Examples - FCP & Permutations

Fundamental Counting Principle: If you have a choices from one set and b choices from another set, then the number of ways that you can pick one item from each is:

$$\underbrace{a}_{\text{\# of choices from set 1}} \times \underbrace{b}_{\text{\# of choices from set 2}}$$

Example: Typical Massachusetts license plates are made up of 2 numbers, followed up 2 letters, then two more numbers. How many possible license plates can be made with this pattern?

Example: Suppose that a password consists of 8 lowercase letters. How many possible passwords can be made?

Example: Stronger passwords include Uppercase letters, numbers, and symbols such as \$&% with a total of 92 possible choices for each character. How many possible 8-character passwords can be made?

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Example: Suppose that you have 9 baseball players to put into a batting order. How many ways can the 9 players be ordered?

Example: Suppose that you have a baseball team with 15 position players (non-pitchers). How many ways can you create a 9-person batting order from those 15 people?

Example: Suppose that you want to put 8 books on a bookshelf - the first 5 will be Math books and the next 3 will be Psychology books. You have 12 Math books and 8 Psychology books to choose from. How many different orderings are there if you put the 5 Math books on the shelf first?