Questions on Homework?

Mar 9-12:23 PM

Warm Up

How many different license plates are possible if a license plate consists of 3 letters followed by 3 digits (the letters O and I are not used) and no letters or digits can be repeated?

letters #

$24 \cdot 23 \cdot 22 \cdot 10 \cdot 9 \cdot 8$

$= 8,743,680$

If repeats are allowed?

$24 \cdot 24 \cdot 24 \cdot 10 \cdot 10 \cdot 10$

$= 13,824,000$

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1.3: PERMUTATIONS
1.4: COMBINATIONS

Learning Targets

- I know the definition of a permutation
- I can calculate the number of permutations using the permutation formula and with a calculator
- I understand the connection between the Fundamental Counting Principle and permutations
- I know the definition of a combination
- I can calculate the number of combinations using the combination formula and with a calculator

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Welcome to the movies...

Suppose a film buyer has 11 films for an 8-screen theater. Since the screens are in rooms with different seating capacities, the film buyer must decide on which screens to show the movies, based on expected ticket sales. How many different arrangements are there for the 8 screens to show the 11 movies?

1 11	2 10	3 9	4 8
5 7	6 6	7 5	8 4

$6,652,800$

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Did order matter?

When a group of objects or people are arranged in a certain order, the arrangement is called a permutation.

The number of permutations of n objects taken r at a time is defined as:

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

${}_nP_r$ (total #, how many chosen)

$= \frac{11!}{(11-8)!}$

$= \frac{11!}{3!} = \frac{11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{3 \cdot 2 \cdot 1}$

PRB nPr

${}_{11}P_8$

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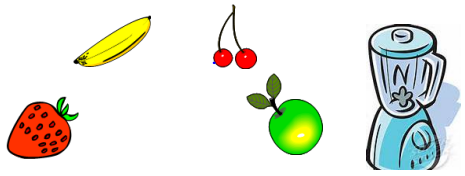
How many ways can you arrange 5 types of crackers on a shelf for display in a store?

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

$5!$ $= 120$

${}_5P_5$

How many different smoothies can we make with 2 of the four fruits?



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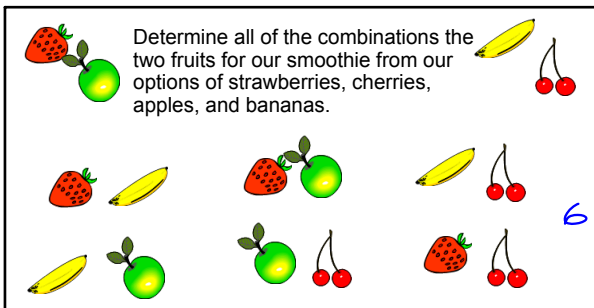

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What if order does not matter?

An arrangement, or listing, in which order is not important is called a combination.

$$C(n,r)=\frac{n!}{r!(n-r)!} \quad = \frac{4\cdot 3\cdot 2\cdot 1}{2\cdot 1\cdot 2\cdot 1} = 6$$

Let's try this with our smoothie problem... $\frac{4!}{2!(4-2)!}$

$_4C_2 = 6$

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Five students from class have been chosen to be on a committee to organize a dance, in how many ways can 4 be chosen to sample the dance? Does the order matter?

no combination

$_5C_4 = 5$

May 28-3:27 PM

14

How many different combinations of two sauces can you do? Does the order matter? $_{14}C_2 = 91$

How many different combinations of three sauces can you do? $_{14}C_3 = 364$

May 28-3:36 PM

Six friends want one photograph taken of each possible pair of friends. Does order matter?

$_6C_2 = 15$

May 28-3:49 PM

What is the big difference between combinations and permutations?

Permutations	Combinations
order matters	order does not matter

How are permutations and the Fundamental Counting Principle related to each other?

May 30-9:42 AM

Today's Assignment:

Section 1.3 #1-15, 17 (Permutations)

Section 1.4 #1-13 (Combinations)

- I know the definition of a permutation
- I can calculate the number of permutations using the permutation formula and with a calculator
- I understand the connection between the Fundamental Counting Principle and permutations
- I know the definition of a combination
- I can calculate the number of combinations using the combination formula and with a calculator

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Attachments

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