Example 1

Police use photographs of various facial features to help witnesses identify suspects. One basic identification kit contains 195 hairlines, 99 eyes and eyebrows, 89 noses, 105 mouths, and 74 chins and cheeks.

The developer of the identification kit claims that it can produce billions of different faces. Is this claim correct?

A witness can clearly remember the hairline and the eyes and eyebrows of a suspect. How many different faces can be produced with this information?

Example 2

The standard configuration for a New York license plate is 3 digits followed by 3 letters.
So, how many digits? AND how many letters

How many different license plates are possible if digits and letters can be repeated?

How many different license plates are possible if digits and letters CANNOT be repeated?

Polar Puzzle

1 What do you call a baby polar bear? _____

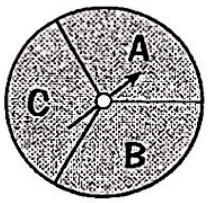
140 18 9229 324 16 15 196 16 158,184 144

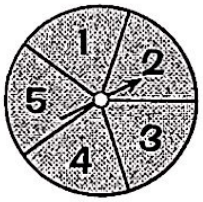
2 What do polar bears eat for lunch? _____

324 16 15 30 144 158,184 27 125 15 27 12

❄ Find each answer in the code. Every time it appears, write the letter of the exercise above it. ❄

E. If you spin each of these spinners once, how many possible outcomes are there?





S. Zoo officials are trying to decide on a name for their new baby polar bear. For a first name, they like either Buddy, Cubby, Snowball, or Alabaster. For a middle name, they like either Frosty, Flake, or Freeze. How many different choices do they have?

N. Java needs a roll of film for her 35-mm camera. Based on the information in the table, how many different kinds of film can she buy?

Speed	100, 200, or 400
Exposures	12, 24, or 36
Type	print or slide

U. License plates in Toontown consist of three letters followed by a digit from 1 to 9, such as **AAA1**. How many different license plates are possible?

G. Dregg guessed the answers to three multiple-choice questions on a test. If each question had 5 different choices, how many different answer combinations were there?

A. Argyle has 10 T-shirts and 7 pairs of shorts that he wears with either sandals or sneakers. If all the colors and patterns coordinate, how many different outfits can he make?

I. Balloons or Bust sells balloons in 18 different colors. Each color comes in 3 sizes. They will inflate the balloon and tie on a gold, green, red, blue, pink, or purple ribbon. How many different choices are there?

R. Camp Cornflake has 3 activity periods with the choices shown. How many different schedules are possible?

Camp Cornflake

PERIOD 1	PERIOD 2	PERIOD 3
leatherwork	archery	canoeing
pottery	riflery	water skiing
basketry	nature study	swimming

B. A 4-course dinner special consists of soup or salad, a main dish, dessert, and coffee or tea. If there are 9 different main dishes and 4 different desserts from which to choose, how many different dinner specials can be ordered?

C. A computer is sold with or without a monitor, with or without a keyboard, with or without a DVD player, and with or without a Zip drive. How many different choices are there?

Example 1: A computer store sells 6 different computers, 4 different monitors, 5 different printers, and 3 different multimedia packages. How many different computer systems are available?

Example 2: How many different 2-digit numbers are there?

Counting objects with restrictions

We will continue to use the fundamental counting principle and use "blanks" instead of trees, but it is important that we count the restricted value first!

Example 3: In each case, how many 2-digit numbers can be formed using the digits 0, 1, 2, 3, and 4?

a) Repetition of digits is allowed.

b) Repetition of digits is not allowed.

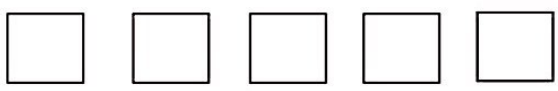
Example 4: A license plate consists of 3 letters followed by 3 digits. Determine the total number of possible license plates if the following conditions apply:

a) There are no restrictions on letter or digits.

b) No letter or number can be repeated.

Example 5: How many odd 3 digit numbers can be made from the numbers {0,1,2,3,4,5,6}?

Example 6: How many arrangements can be formed using all of the letters of the word MUSIC?



Example 7: Your teacher announces there will be a seating plan change next week. How many possible seating plans can be made if there are 20 students and 20 desks?