Math 1324
Section 5.3
The Multiplication Principle

The videos corresponding to this worksheet can be found at
https://online.math.uh.edu/Math1324/.
UH students can also view the videos within the Math 1324 textbook.

Generalized Multiplication Principle

Suppose a task T_1 can be performed in N_1 ways, a task T_2 can be performed in N_2 ways,…, and, finally a task T_n can be performed in N_n ways. Then the number of ways of performing the tasks $T_1, T_2, ..., T_n$, in succession, is given by the product $N_1 N_2 \bullet\bullet\bullet N_n$.

Example 1: An ice cream shop has 15 ice cream flavors and 4 different kind of waffle cones. How many possible ice cream cones can be made, if a customer selects one ice cream flavor and one kind of waffle cone?

Example 2: A coin is tossed 3 times.
a. How many possible outcomes are there?

b. List all possible outcomes by the aid of a tree diagram.

Example 3: An identification number for employees at a certain company is made up of eight digits.

a. How many ID numbers are possible if repetition is allowed?

b. How many ID numbers are possible if repetition is not allowed and the first digit cannot be 0?

Example 4: A license plate consists of two letters followed by three digits. How many license plates are possible if the 1st letter can't be O, the 1st digit can't be 0 and no repetitions are allowed?