Module 7A: Counting with the Additive and Multiplicative Rules

MTH 225
19 Oct 2020

Agenda

- Review of Daily Prep activity + Q/A time
- Activities:
  - Constructing functions with given surjective/injective properties
  - Inverse images
- Q&A and quizzing

Two new GVSU professors need to assigned offices. There are 12 offices available to choose from, and each prof gets his/her own office (i.e. they don't share). How many different assignments are possible?

- 12
- 23
- 121
- 132
- 144
- None of the above

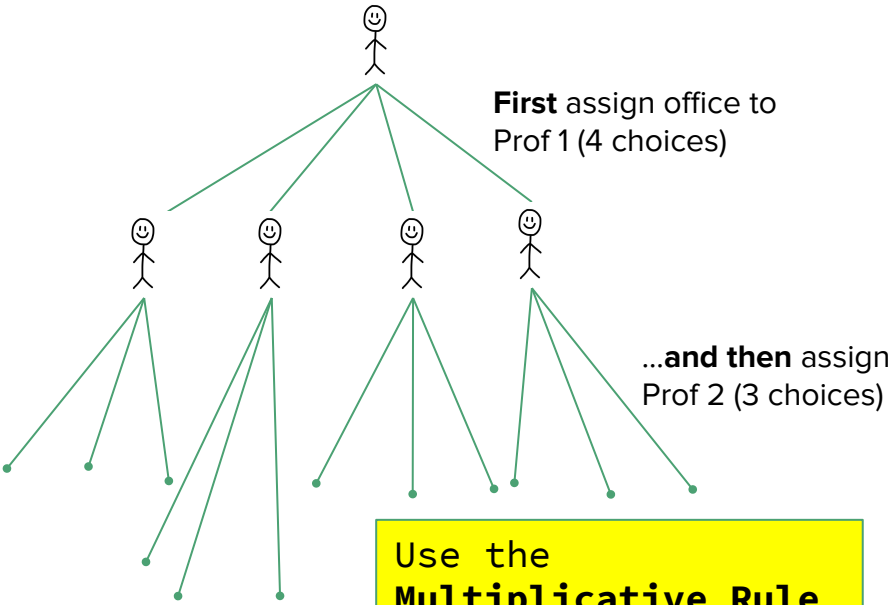
To 0

A third new GVSU prof also needs an office. There are 8 offices available in Mackinac and 5 available in Kindschi, and the prof must go in one of those two buildings. How many different office assignments are possible for this prof?

- 13
- 32
- 35
- 40
- None of the above

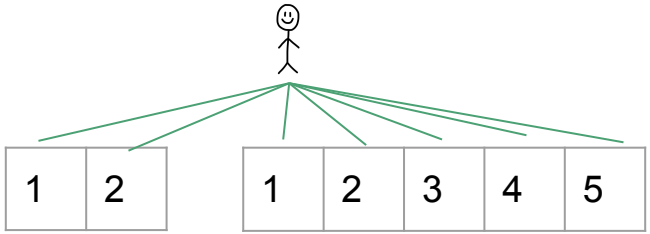
What makes these two situations different?

First situation was a **procedure** with a **sequence of two tasks**.



Use the **Multiplicative Rule** in this case

Second situation was a **single task** with **multiple ways to perform it.**



Offices in MAK

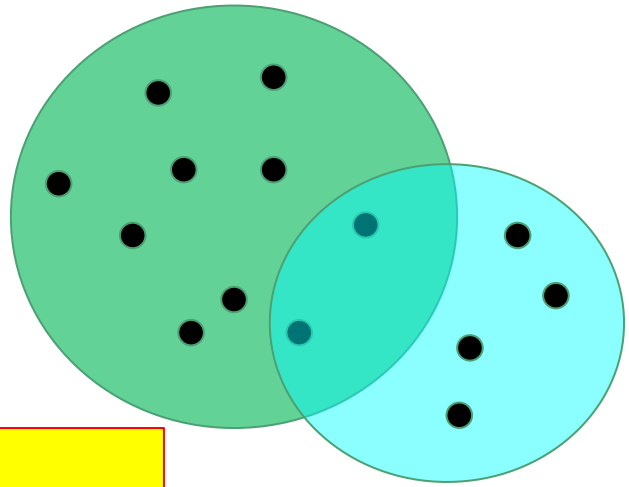
Offices in Kindschi

Use the **Additive Rule** in this case

Suppose A and B are two finite sets with $|A| = 10$ and $|B| = 6$. Then the cardinality of $A \cup B$

- 4
- 16
- 60
- Cannot be determined with just this information

Cardinality of the union != sum of the cardinalities always



$$|A| = 10$$

$$|B| = 6$$

but...

$$|A \cup B| = 14$$

Principle of Inclusion/Exclusion (PIE)

$$|A \cup B| = |A| + |B| - |A \cap B|$$

Poll activities to practice the basic rules

How many bit strings of length 8 (for example, 10011010) are there?

- 8
- 16
- 64
- 256
- None of the above

The license plate numbers in a certain state are strings consisting of three English letters followed by a three-digit positive integer (for example, WTF 023). How many possible license plates are there using that system?

- 108
- 18576
- 11232000
- 17576000
- None of the above

The license plate numbers in a certain state are strings consisting of three English letters followed by a three-digit positive integer. How many possible license plates are there using that system *if no duplicate letters are allowed?*

Join by Web

Join by Text

How many integers between 1 and 50 (including 1 and 50) are there, that are divisible by either 8 or by 10?

- 5
- 8
- 9
- 10
- 18
- None of the above

A multiple choice test has 10 questions, and there are four possible answers for each question. In how many ways can you answer the questions on the test if you answer each question (i.e. don't skip anything)?

- 14
- 16
- 40
- 5040
- 10000
- 1048576
- 3628800
- None of the above

To 0

Have a great day 😀

Check your info sources to stay up to speed!