MATH 120 In-class Activity
Day 5

Question 1.

(a) A grocery store sells 5 types of juice, 6 types of soda, and 3 types of energy drinks. How many different ways are there to choose one of those types of drink?

(b) How can you describe your answer using sets and set notation? What set are you counting to solve the question? What about this situation allows you to apply addition?

(c) How many ways are there to take home three drinks: one juice, one soda, and one energy drink?

(d) How can you describe your answer using sets and set notation? What set are you counting to solve the question? What about this situation allows you to apply multiplication?

Question 2. How many nine-digit numbers are made up of numbers from 1–9 in some order, like 324761589?

Question 3. How many four-digit numbers are made up of four consecutive numbers from 1–9 in some order, like 5342 or 7658?

Question 4. This question relates to license plates of length 6 where each character is either a letter (A–Z) or a number (0–9). Every character is distinct.

(a) How many different license plates are possible if there are no restrictions on which characters can appear where?

(b) Up until recently, license plates from the Netherlands had the form XX-YY-ZZ, where each of XX, YY, and ZZ is either a pair of numbers OR a pair of letters, like LA-97-BB or 11-92-60, or GO-MA-TH. How many different license plates of this form are possible?

(c) The new license plates in the Netherlands are of the form A-BBB-CC where A is a letter, BBB are a triple of numbers, and CC is a pair of letters (or vice versa with number-letters-numbers) OR of the form AA-BBB-C, where AA are letters, BBB are numbers, and C is a letter (or vice versa with numbers-letters-number). How many different license plates of this form are possible?

(d) Are there any duplicates between license plates of the form in part (b) and part (c)?

If so, what would they look like? If not, how can you justify this?

(e) If the government of the Netherlands wanted to issue more license plates with six characters that do not repeat any currently issued license plates, what number/letter pattern would you advise them to follow in order to make as many license plates as possible?