MATH 120 In-class Activity
Day 4

If you complete an activity before the end of its allotted time, work together to think about how you might push the ideas further. Alternatively, come up with different questions of a similar type to make sure you understand that learning objective more deeply.

Question 1.

Determine whether the "OR" in each of these phrases is an inclusive OR or an exclusive OR.

(a) Your classmate asks "Do you have any cats OR dogs?".

(b) It's Halloween and your little sister knocks on a door. She says "Trick OR Treat!".

(c) The person at the door says "What an amazing costume! You can choose a Snickers Bar OR a Reese's Cup.".

(d) The meeting will take place on Monday OR Tuesday.

Question 2.

What is the negation of the statement in Question 1(d)?   (Do not use the words OR nor NOR.)

Question 3.

How can you write the set of possible sequences of 42 coin flips as a Cartesian Product?

Question 4.

Let P be the positive multiples of 3.
Let Q be the positive multiples of 5.

(a) Describe in words the set $A = P \cap Q$. Simplify your wording as much as possible.

(b) Describe in words the set $B = Q \setminus P$. Simplify your wording as much as possible.

(c) Describe in words the set $C = (P \cup Q)^c$. Simplify your wording as much as possible.

(d) Choose one of A, B, or C to write in roster notation. Choose a different set to write in set-builder notation.

(e) Reflect on why certain sets easier to write in roster notation and certain sets easier to write in set-builder notation. Why is that?

Question 5.

In front of you is a basket full of identical red marbles, identical yellow marbles, and identical blue marbles. You are allowed to choose exactly three marbles to take home in a bag. You may choose any colors and may repeat colors if you want.

[*Side note:* Because repetition is allowed, this is no longer a *set*. Instead, this is an example of a *multiset*, which we will discuss later in the course.]

(a) Write out the set S containing all possible choices you could make.

(b) Now **condition** on how many red marbles are in the bag. Let S_r be the set of choices in which there are r red marbles. How many sets S_r are there? Which elements of S are in each set S_r?

(c) Why is it the case that two sets S_i and S_j are disjoint when $i \neq j$?