Homework 1: Math 3215-C (Probability and Statistics)

Due August 24th

All problems are worth 2 points (20 total) and you can get a partial point.

Problem 1. *Is it true that, for any two events A and B, $(A \setminus B) \cup B = A$?*

Problem 2. *Do problem 1.1-4.*

Problem 3. *Do problem 1.1-8.*

Problem 4. *Prove that, for any two events A, B and C,*

$$P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(A \cap C) - P(B \cap C) + P(A \cap B \cap C).$$

Problem 5. *Let $S = \mathbb{N}$ ($\mathbb{N} = \{1, 2, \dots\}$ - the set of all natural numbers) and consider the following set function P:*

$$P(A) = \begin{cases} 0 & A \text{ is finite} \\ 1 & \text{otherwise} \end{cases}.$$

Does P define probability? Check all 3 conditions in the definition and prove the ones it satisfies.

Problem 6. *How many combinations one has to try to unlock a password of length 7 that contains only digits 0-9.*

Problem 7. *Find the number of triple digit odd numbers using multiplication principle.*

Problem 8. *Do problem 1.2-10.*

Problem 9. *Do problem 1.2-12.*

Problem 10. *Do problem 1.2-13(a-c).*