Homework #1, Due: 1/17
Math 181 (Discrete Structures), Spring 2024

Problem 1 is worth 4 points (1 pt each part), problem 2 is worth 4 points (2 pts each part), and problem 3 is worth 2 points, for a total of 10 points. Remember to *show your work* and *explain your answers* on all problems!

1. In this problem, let the universal set be $U = \{1, 2, 3, \ldots, 10\}$, and let $A = \{1, 3, 5, 9, 10\}$, $B = \{4, 5, 6, 7, 10\}$, $C = \{3, 4, 6, 10\}$. List the elements of the following sets.

   (a) $A \setminus B$ (Note that the book uses the notation $A - B$ for this set.)

   (b) A^c (Note that the book uses the notation $\overline{A}$ for this set.)

   (c) $(A \cap B) \setminus C$

   (d) $(A \cap B)^c \cup C$

2. In this problem, there is a group of 120 students, of which 5 are taking French, business, and music; 20 are taking French and business; 30 are taking French and music; 15 are taking business and music; 60 are taking French; 50 are taking business; and 40 are taking music. **Hint**: Example 1.1.21 in the book explains how to use Venn diagrams for this kind of problem.

   (a) How many are taking business and neither French nor music?

   (b) How many are taking French or business (or both)?

3. List all the partitions of the set $\{a, b, c\}$.