

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

Problem 1 is worth 4 points, problem 2 is worth 4 points, 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 $U = \{1, 2, 3, \dots, 10\}$, 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 \bar{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 $\{a, b, c\}$.