MATH 2001
SET OPERATIONS

Exercise 1. Express each of the following sets in set builder notation.

i.) $A \cap B =$

ii.) $A \cup B =$

iii.) $A - B =$

iv.) $\overline{A} =$

Exercise 2. Let $A = \{\text{NJ, MD, MA, ME, CO}\}$, $B = \{\text{MA, ME, CO, UT}\}$, and U be the set of states in the US. Give an explicit answer to each of the following.

i.) $A \cap B =$

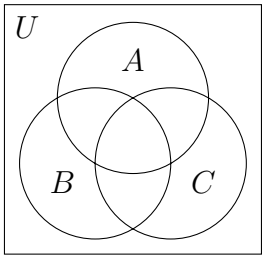
ii.) $A \cup B =$

iii.) $A - B =$

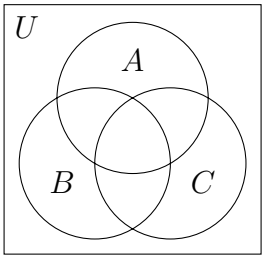
iv.) $|\overline{A}| =$

Exercise 3. Shade the region in the Venn diagram that corresponds to each of the following sets.

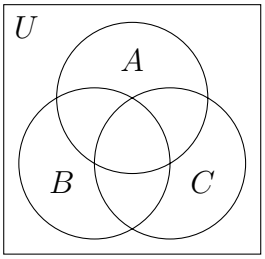
i.) $A \cap B$



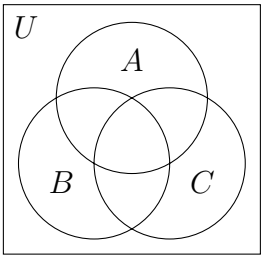
iii.) $\overline{A} \cap C$



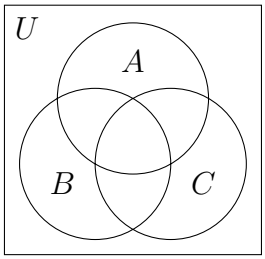
v.) $(A \cap A) - (C \cup B)$



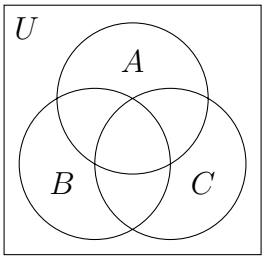
vii.) $A \cap ((A - C) \cup B)$



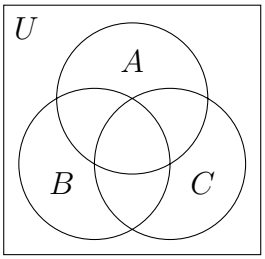
ii.) $B \cup C$



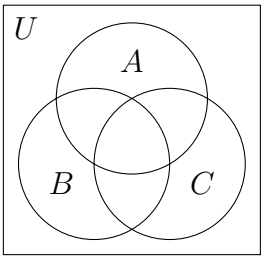
iv.) $A \cap B \cap C$



vi.) $(A \cap (A - C)) \cup B$

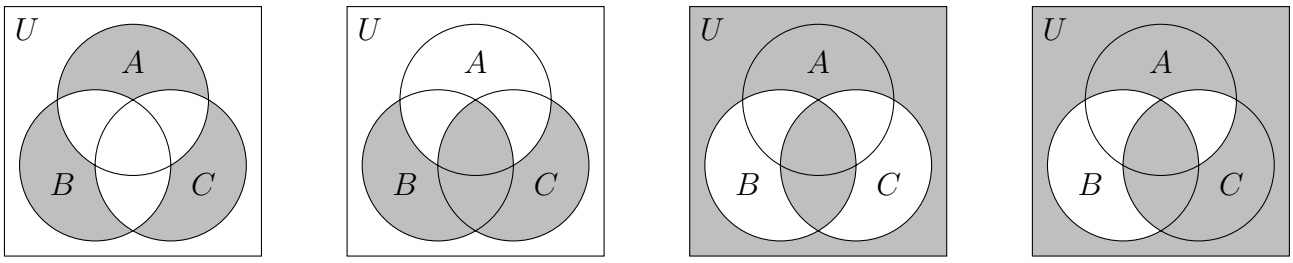


viii.) $A \cap (A - (C \cup B))$



Exercise 4. Give an expression that describes each shaded region.

i.) ii.) iii.) iv.)



i.)

ii.)

iii.)

iv.)

Exercise 5. Simplify each expression (if possible), then express the set in set builder notation.

i.) $A \cup A \cup B$

ii.) $B - (B - A)$

iii.) $(B - B) - A$

iv.) $B - (C - A)$

v.) $C - \overline{A}$

vi.) $\overline{A} \cap B \cap C$

vii.) $A \cup (B \cap \overline{B})$

viii.) $\overline{A \cup B}$

Homework. Due Monday, February 1 at 6pm.

- Respond to the poll: https://www.surveymonkey.com/r/GassertStudentVideoConsent
- Read Sections 1.5–7 from the text.
- Complete the following exercises (add these to your Overleaf file with the other book problems).
  - Section 1.5: 4 (all).
  - Section 1.6: 2 (all).
  - Section 1.7: 7, 8. (You do not have to turn in the pictures.)