PMAT 2320 – Discrete Mathematics — Assignment #3
Fall 2000

Instructions

- Answer each question completely; justify your answers.
- This assignment is due at 9:00 am on October 6, 2000.

1. Let $A = \{1, 2, 3, 4, 5, 6\}$, $B = \{0, 2, 4, 6\}$, and $C = \{0, 3, 6, 9\}$.

   (a) Draw a Venn diagram showing the relationship between the sets. Label each element.

   (b) What are:

   i. $A \cup B$
   ii. $B \cap C$
   iii. $A \cup (B \cap C)$
   iv. $(A \cup B) \cap C$
   v. $A \setminus (B \cup C)$
   vi. $(B \cup C) \setminus A$
   vii. $A \setminus (A \setminus B)$
   viii. $A \oplus B$
   ix. $\mathcal{P}(B \cap C)$
   x. $(A \cap C) \times B$

2. Prove that $A \setminus (B \cup C) = (A \setminus B) \cap (A \setminus C)$, where A, B, and C are sets.

3. Let $A = (-\infty, 7]$, $B = [-3, 10)$, $C = (8, 30)$, and $U = \mathbb{R}$. What are:

   (a) $A \cap B$
   (b) $A \cup C$
   (c) $A^c \setminus (B \cup C)$
   (d) $(B \cup C)^c \setminus (A \cup B)$
   (e) $A \oplus B \oplus C$
   (f) $C \setminus B^c$

4. Exercise 1.2.22 (except part (a)).

5. Exercise 1.2.23