Shiraz University
Computer Science and Engineering Dept.
Discrete Mathematics
Fall 2019
HW #4

Shiraz University

---

1. If $A = [0, 3]$, $B = [2, 7)$, with $\mathcal{U} = \mathbf{R}$, determine each of the following:

   a) $A \cap B$ **b)** $A \cup B$

   c) $\overline{A}$ **d)** $A \triangle B$

2. Using the laws of set theory, simplify each of the following:

   a) $A \cap (B - A)$

   b) $(A \cap B) \cup (A \cap B \cap \overline{C} \cap D) \cup (\overline{A} \cap B)$

   c) $(A - B) \cup (A \cap B)$

   d) $\overline{A} \cup \overline{B} \cup (A \cap B \cap \overline{C})$

3. Prove or disprove that for all sets A, B, and C, we have

   a) $A \times (B \cup C) = (A \times B) \cup (A \times C)$.

   b) $A \times (B \cap C) = (A \times B) \cap (A \times C)$.

4. Let

$$\mathbf{A} = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}.$$

   Find

   a) $\mathbf{A}^{[2]}$.

   b) $\mathbf{A} \vee \mathbf{A}^{[2]} \vee \mathbf{A}^{[3]}$.