MATH 130A Review: Algebra of Sets

Facts to Know

- Sets
- Unions
- Intersections
- Complements
- Associative laws
  - $A \cup (B \cup C) =$
  - $A \cap (B \cap C) =$
- Commutative laws
  - $A \cup B =$
  - $A \cap B =$
- Distributive laws
  - $A \cup (B \cap C) =$
  - $A \cap (B \cup C) =$
- Miscellaneous facts
  - $A \cap B = \varnothing$ and $A \cup B = U \implies B = A^{\mathsf{c}}$
  - $\varnothing^{\mathsf{c}} = U$
  - $U^{\mathsf{c}} = \varnothing$
  - $A^{\mathsf{cc}} = A$
  - $(A \cup B)^{\mathsf{c}} = A^{\mathsf{c}} \cap B^{\mathsf{c}}$
  - $(A \cap B)^{\mathsf{c}} = A^{\mathsf{c}} \cup B^{\mathsf{c}}$

Examples

- If the universal set is given by $U = \{1, 2, 3, 4, 5, 6\}$, and $A = \{1, 2\}$, $B = \{2, 4, 5\}$ are two subsets, find the following sets:
  - $A \cup B$
  - $A \cap B$
  - A^{c}
  - B^{c}

- If the universal set is given by $U = (-\infty, +\infty) = \mathbb{R}$, and $A = [1, 2]$, $B = [2, 5]$ are two subsets, find the following sets:
  - $A \cup B$
  - $A \cap B$
  - A^{c}
  - B^{c}