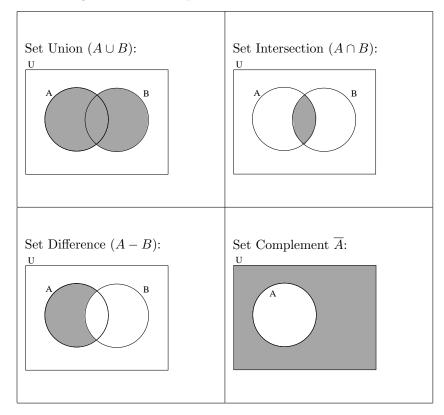
Definitions:

- Given two sets A and B, the union of these sets, denoted $A \cup B$, is the set containing the elements that are either in A or in B (or in both). That is, $A \cup B = \{x : x \in A \lor x \in B\}$.
- Given two sets A and B, the *intersection* of these sets, denoted $A \cap B$, is the set containing the elements that are in both A and B. That is, $A \cap B = \{x : x \in A \land x \in B\}$.
- Given two sets A and B, the *difference* of these sets, denoted A B, is the set containing the elements that are in A but not in B. That is, $A B = \{x : x \in A \land x \notin B\}$. Note: In general, $A B \neq B A$.
- Given a universal set U and a set A, the *complement* of the set A with respect to the set U, denoted \overline{A} , is the set U A. That is, $\overline{A} = \{x \in U : x \notin A\}$.
- Two sets A and B are **disjoint** if their intersection is empty. That is, if $A \cap B = \emptyset$.

Venn Diagrams for Set Operations:



Examples: Let $A = \{a, b, c, d, e, f\}, B = \{a, c, e, f, g, h, i\}, C = \{b, c, d, f, g, h\}$ and $U = \{a, b, c, d, e, f, g, h, i, j\}$

- 1. $A\cup B=\{a,b,c,d,e,f,g,h,i\}$
- 2. $A \cap B = \{a, c, e, f\}$
- 3. $A C = \{a, e\}$
- 4. $\overline{C} = \{a, e, i, j\}$
- 5. $A (B \cup C) = A (\{a, b, c, d, e, f, g, h, i\}) = \emptyset$
- 6. $A \cup (B \cap C) = A \cup (\{c, f, g, h\}) = \{a, b, c, d, e, f, g, h\}$