Set definitions – memorize these!

Definition of subset:	$A \subseteq B \;\Leftrightarrow\; \forall x \in U \; (x \in A) \to (x \in B)$
Definition of set equality:	$A = B \;\Leftrightarrow\; (A \subseteq B) \wedge (B \subseteq A)$
Definition of union:	$A \cup B = \{x \in U \mid x \in A \vee x \in B\}$
Definition of intersection:	$A \cap B = \{x \in U \mid x \in A \wedge x \in B\}$
Definition of set difference:	$A - B = \{x \in U \mid x \in A \wedge x \notin B\}$
Definition of complement:	$A^c = \{x \in U \mid x \notin A\}$
Definition of power set:	$\mathcal{P}(A) = \{X \in U \mid X \subseteq A\}$
Definition of Cartesian product:	$A \times B = \{(x, y) \in U \mid x \in A \wedge y \in B\}$

Procedural definitions:

Definition of union:	$x \in A \cup B \;\Leftrightarrow\; x \in A \vee x \in B$
Definition of intersection:	$x \in A \cap B \;\Leftrightarrow\; x \in A \wedge x \in B$
Definition of set difference:	$x \in A - B \;\Leftrightarrow\; x \in A \wedge x \notin B$
Definition of complement:	$x \in A^c \;\Leftrightarrow\; x \notin A \;\Leftrightarrow\; \sim(x \in A)$
Definition of power set:	$X \in \mathcal{P}(A) \;\Leftrightarrow\; X \subseteq A$
Definition of Cartesian product:	$(x, y) \in A \times B \;\Leftrightarrow\; x \in A \wedge y \in B$

"$\Leftrightarrow$" means "if and only if," or in other words, if the left side is true, then the right side is true, and vice-versa. You can use it the same way you use the "$\equiv$" sign. These signs are used in definitions to mean that you can replace the left side with the right side and vice versa.