

### Sections 1.3 & 1.4 Sets and Operations

A set is a collection of objects. The objects in a set are called elements.

The intersection of two sets  $A$  and  $B$  is the set  $A \cap B$  defined as follows:

$$A \cap B = \{x : x \in A \text{ and } x \in B\}.$$

The union of  $A$  and  $B$  is the set  $A \cup B$  defined as follows:

$$A \cup B = \{x : x \in A \text{ or } x \in B\}.$$

The difference of  $A$  and  $B$  is the set  $A \setminus B$  defined as follows:

$$A \setminus B = \{x : x \in A \text{ and } x \notin B\}.$$

The complement of a set  $A$  is the set  $A^c$  defined as follows:

$$A^c = \{x : x \notin A\}.$$

The symmetric difference of  $A$  and  $B$  is the set  $A \triangle B$  defined as follows:

$$A \triangle B = (A \setminus B) \cup (B \setminus A).$$

Suppose  $A$  and  $B$  are sets. We will say that  $A$  is a subset of  $B$ , and write  $A \subseteq B$ , if every element of  $A$  is also an element of  $B$ .

$A$  and  $B$  are said to be disjoint if  $A \cap B = \emptyset$ . ie,  $A$  and  $B$  have no elements in common.