

# Mathematics for Computing

## Subsets and Elements of Sets

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# Subsets and Elements of Sets

## Elements of a Set

- ▶ Sets are comprised of members, which are often called **elements**.
- ▶ If a particular value ( $k$ ) is an element of set  $A$ , then we would write this as

$$k \in A$$

- ▶ If a single value  $k$  is not an element of set  $A$ , then we write

$$k \notin A$$

# Subsets and Elements of Sets

## Subsets

Given two sets  $A$  and  $B$ , the set  $A$  is a **subset** of set  $B$  if every element of  $A$  is also an element of  $B$ . We write this mathematically as

$$A \subseteq B$$

Sets are denoted with curly braces, even if they contain only one element.

# Subsets and Elements of Sets

## Subsets

Suppose we have the set  $A$  comprised of the following elements

$$A = \{3, 5, 7, 9\}$$

The value 5 is an element of  $A$

$$5 \in A$$

The single element set  $\{5\}$  is a subset of  $A$ .

$$\{5\} \subseteq A$$

# Subsets and Elements of Sets

## Proper Subsets

Given two sets  $A$  and  $B$ , the set  $A$  is a **proper subset** of set  $B$  if every element of  $A$  is also an element of  $B$ , but there are elements of set  $B$  that are not in set  $A$ .

We write this mathematically as

$$A \subset B$$

# Subsets and Elements of Sets

## Equivalent Sets

If both of the following two statements are **true**,

$$1) A \subseteq B$$

$$2) B \subseteq A$$

then  $A$  and  $B$  are **equivalent sets**.

# Subsets and Elements of Sets

## Non-Comparable Sets

If both of the following two statements are **false**,

$$1) A \subseteq B$$

$$2) B \subseteq A$$

then  $A$  and  $B$  are said to be said to be **noncomparable sets**.