Section 2.1: Sets

- A **set** is a collection of objects. A set is usually denoted with a capital letter.

- An **element** is an object in the set.

THREE DIFFERENT WAYS TO DEFINE A SET:

1. **Verbal Description:** The set of all states in the United States which start with the letter O.

2. **Listing method:** Listing the elements separated by commas. $\{Oklahoma, Ohio, Oregon\}$.

3. **Set-Builder Notation:** $\{x \mid x$ is a US state which begins with the letter O $\}$.

NOTATION:

- $\in$ denotes that an object is in the set.

- $\notin$ denotes that the object is NOT in the set.

- $\emptyset$ or $\{\}$ denote the **empty set**. The empty set is a set with no elements.

BE CAREFUL! The notation $\{\emptyset\}$ does NOT represent the empty set.

OTHER DEFINITIONS:

- **Equal Sets:** Two sets A and B are equal, denoted $A = B$, if and only if they have the same elements.

- **Subset of a set:** Set A is said the be a subset of B, denoted $A \subseteq B$, if and only if every element of A is also an element of B.

- **Proper subset:** A is a proper subset of B, denoted $A \subset B$, if $A \subseteq B$ and B has an element that is not in A.

- **Disjoint sets:** A and B are disjoint if they have no elements in common.