SET THEORY

A **set** is a collection of elements. An **element** is a member of a set.

\[ \in \] read as “... is an element of...”

\[ \notin \] read as “... is not an element of...”

**THREE WAYS TO WRITE SETS**

1. The **roster method** uses set braces and commas to list the elements of a set.

   \[ \{1, 2\} \] read as “The set one, two.”

   • • • read as “and so on”

   The **ellipsis** is three dots used to indicate that a pattern that has been established continues.

   \[ \{2, 4, 6, \ldots, 18\} \] denotes the set of even numbers between 1 and 19.

2. **Set builder notation** uses set braces and commas to list the elements of a set.

   \[ \{x \mid x < 0\} \] read as “The set of all x such that x is less than zero.”

3. A **Venn diagram** is a visual representation of sets using circles and rectangles that show set relationships – intersection, union, complement.

**SET THEORY**

A **cardinal number** is a whole number that indicates how many distinct (i.e., unique or different) elements a set contains.

\[ n(A) \] read as “the cardinality of set A”

The **cardinality** of a set is the number of unique elements contained in that set.

\[ A' \] read as “the complement of A” or “not A”

The **complement** of set A is the set of all elements in the universal set **except** those in set A.

\[ \cap \] read as “intersect”, means **AND**

The **intersection** of two sets is the set that contains all the elements that the two sets have in common.

\[ \cup \] read as “union”, means **OR**

The **union** of two sets is the set that all the elements of the two sets and no others.

\[ U \] read as “the universal set”

The **universal set** contains all elements under consideration.

\[ \emptyset \] or \[ \{\} \] read as “the empty set” or “the null set”.

The **empty set** contains no elements.