TSC | WILLIAM D. LAW, JR. LEARNING COMMONS

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."

$\{2,4,6,\ldots,18\}$ 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.

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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.

$\varnothing$ **or** $\{\ \}$ read as "the empty set" or "the null set".

The **empty set** contains no elements.

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