Sets

A set is a collection of well-defined objects.

Methods for Describing Sets	Definition	Example
Word Description	An accurate description of the set.	The set of Natural numbers less than 9.
Roster	A list of elements inside braces.	A = {1, 2, 3, 4, 5, 6, 7, 8}
Set Builder	Shorthand used to write sets.	A = {x ∈ ℕ | x < 9} This read as: The set of all x's element of natural numbers, such that x less than 9.

Symbol	Name	Definition	Example	Remark
∅ or { }	Empty Set or Null Set	The set that contains no elements.	A = { } A = ∅	The ∅ symbol should not be confused with 0. ∅ is a set which has no elements. 0 is an element that has no value.
U	Universal Set	The set of all elements for a discussion or problem.	U = {All students who come to the Learning &Tutoring Center for tutoring.}	U set includes students who come to the LTC for any reason.
A'	Complement of Set A	The set of all objects in the universal set but not in set A.	U = {2, 3, 4, 5, 6, 7} A = {1, 3, 5} A' = {2, 4, 6, 7}	The complement of set A is A' = {2, 4, 6, 7}
∈	Element of	This is used to indicate that an element is part of a set.	B = {0, 1, 5, 6, 9} 5 ∈ B	Read as: 5 is an element in set B.
∉	Not an element of	This is used to indicate that an element is not a part of a set.	B = {0, 1, 5, 6, 9} 2 ∉ B	Read as: 2 is not an element in set B.
n(A)	Cardinal Number	The number of distinct elements in set A.	A = {a, d, e, g, h} n(A) = 5	Read as: n of A equals 5.
n(A) = n(B)	Equivalent sets	The cardinal number of elements in Set A and Set B is the same.	A = {a, b, d, g, h} B = {0, 1, 3, 5, 7} n(A) = n(B) = 5	n(A) = 5 n(B) = 5 n(A) = n(B) = 5
A = B	Set equality	Set A and Set B	A = {2, 4, 7, 8, 9}	Equal sets have exactly the

		contain the same elements regardless of order or possible repetition of elements.	B = {4, 7, 2, 9, 8} A = B	same elements, while equivalent sets have the same number of elements.
$A \subseteq B$	Subset	Every element in Set A is also an element in Set B.	A = {a, b, c} B = {a, c, b, d, e} $A \subseteq B$.	Read as: Set A is a subset of set B.
$A \subset B$	Proper subset	Every element in Set A is also in Set B. The number of elements in Set A is not equal to the number in Set B.	A = {1, 2, 3} B = {2, 4, 1, 3, 7} $A \subset B$	Read as: Set A is a proper subset to Set B.
$A \cap B$	Intersection	The set of elements common to both Set A and Set B.	A = {1, 2, 3, 4} B = {2, 4, 6, 8} $A \cap B$ = {2, 4}	2 and 4 are common elements to Set A and Set B.
$A \cup B$	Union	The set of elements belong to either set A or set B.	A = {1, 2, 3, 4, 5} B = {- 1, 0, 1, 2, 3} $A \cup B$ = {-1, 0, 1, 2, 3, 4, 5}.	
$A - B$ or $A \setminus B$	Set difference	The set of elements belong to Set A but not Set B.	A = {1, 2, 3, 4, 5, 6} B = {2, 4, 6, 8, 10} $A - B$ or $A \setminus B$ = {1, 3, 5}	
$\mathbb{N}$	Set of Natural Numbers	The set of counting numbers.	$\mathbb{N}$ = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, …}	Set of Natural Numbers contains only positive numbers and could not be decimals, fractions and 0.
$\mathbb{W}$	Set of Whole Numbers	The set of whole numbers is the set of natural numbers and 0.	$\mathbb{W}$ = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, …}	
$\mathbb{I}$ or $\mathbb{Z}$	Set of Integer Numbers	The set of whole numbers, 0, and negative numbers.	$\mathbb{I}$ = {…,- 4, - 3, -2, - 1, 0, 1, 2, 3, …}	

Note: A set with n elements has 2^n **subsets** and $2^n - 1$ **proper subsets.**