


MGF1106
Liberal Arts Mathematics I
Sets Summary

Set: A well-defined collection of objects
Sets are indicated by { }

Element: An individual object of a set
Ex: $A = \{1, 2, 3, 4\}; 1 \in A, \text{ not } \{1\} \in A$

Describing sets [3 ways]:

1. verbal description (a sentence description of the set)
2. roster form (listing each individual element)
3. set-builder notation (using a variable to stand for any element & a brief verbal description)

Examples

Set G is the set of US states that border the Gulf of Mexico

roster: $G = \{FL, AL, MS, LA, TX\}$

set-builder: $G = \{x | x \text{ is a state bordering the Gulf of Mexico}\}$

Empty (Null) set: a set with no elements; symbolized by \emptyset or $\{ \}$

Equal sets: 2 sets are equal if they have the exact same elements (not necessarily in the same order)

Equivalent sets: 2 sets are equivalent if they have the same *number* of elements

Subset: A is a subset of B ($A \subseteq B$) if every element of A is also an element of B

Proper subset: A is a proper subset of B ($A \subset B$) if every element of A is also an element of B & $A \neq B$

- the null set is a subset of every other set

Universal set: the set of all elements under consideration (symbolized by U)

Number of subsets:
a set of n elements has 2^n subsets

Intersection: of 2 sets A & B ($A \cap B$) is the set of all elements common to A & B
 $A \cap B = \{x | x \in A \ \& \ x \in B\}$ (i.e. only what they have in common)

Union: of 2 sets A & B ($A \cup B$) is the set of elements either in A , B , or both
 $A \cup B = \{x | x \in A \ \text{or} \ x \in B\}$

Complement: of set A is everything left in the Universal set after you remove the elements of set A (A')
 $U = \{1, 2, 3, \dots, 10\}$
Ex: $A = \{2, 4, 6, 8\}$ $A' = \{1, 3, 5, 7, 9, 10\}$

Difference: of 2 sets A & B ($A - B$) is the set of all elements that are in A and not in B
 $A - B = \{x | x \in A \ \& \ x \notin B\}$ (what is left in A after you take away the common elements with B)