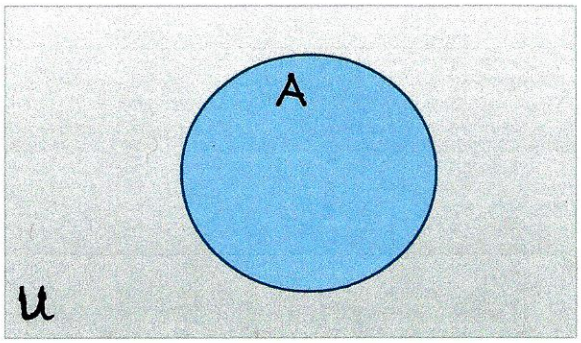
I. Venn Diagrams:

1. visual or picture representation of sets.
2. starts with a broad/general group called the universe. The universe is a rectangle.
3. Inside the rectangle are smaller groups called subsets. Subsets are usually a circle.

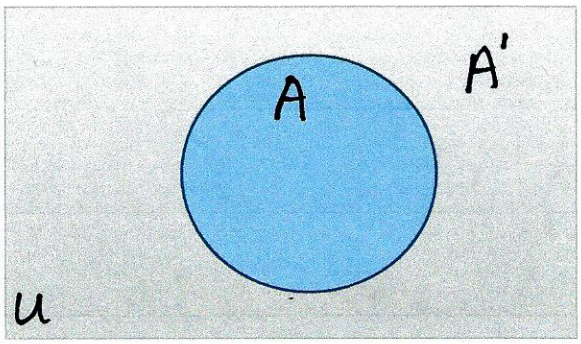


$\mathcal{U}$ = All MTSU students

A = All female students

II. Compliment of a Set:

1. compliment means opposite, not, or outside
2. they are elements not part of a given set.
3. These elements are still part of the universe
4. noted by a raised mark A′ A-compliment A-prime
5. A and A′ equal the universe

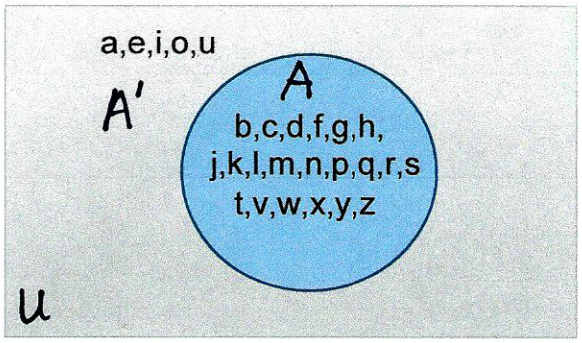


$\mathcal{U}$ = All MTSU students

A = All female students

A′ = All male students

EXAMPLE:



$\mathcal{U}$ = {American Alphabet}

A = Consonants

A′ = vowels

EXAMPLE: What is the compliment of the given set?

$\mathcal{U}$ = {a, b, c, d, e, f, g, h}

M = {a, b, e, f} M′ = $\{c, d, g, h\}$

N = {b, d, e, g, h} N′ = $\{a, c, f\}$

EXAMPLE:

1. If a Universe contains all sets, then the compliment of the Universe is what?

$\mathcal{U}' = \emptyset$

2. If an Empty set has no sets, then the compliment of an Empty set is what?

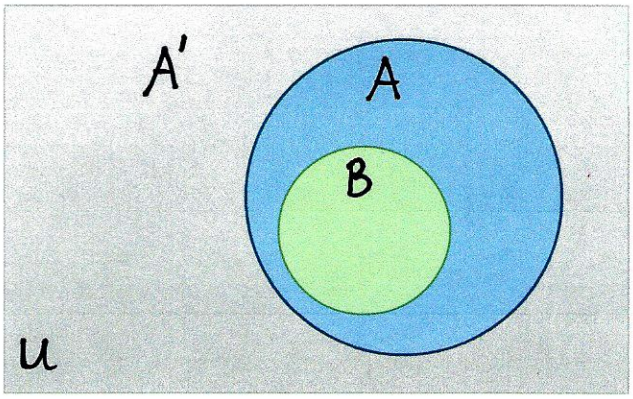
$\emptyset' = \mathcal{U}$

III. Subset of a Set:

1. is A part or group of the universe
2. can be part or group of another set
3. is A combination of elements
4. All elements in subset B must be in set A

To show a set is a subset of another set, use this symbol: $\subseteq$

To show a set is not a subset, use this symbol: $\not\subseteq$



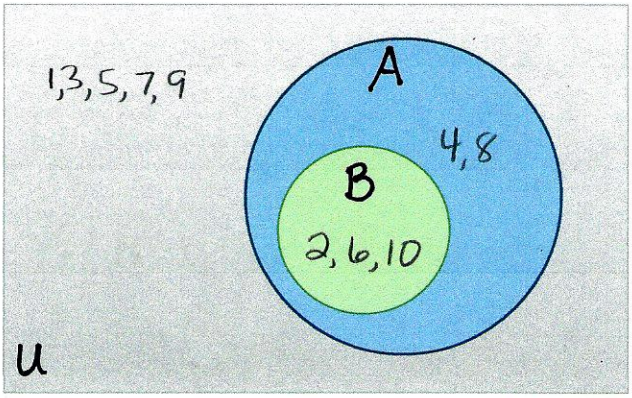
$\mathcal{U}$ = All MTSU students

A = All female students $A \subseteq U$

A' = All male students

B = All female athletes $B \subseteq A$

EXAMPLE:



$\mathcal{U}$ = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}

A = {2, 4, 6, 8, 10} $A \subseteq U$

B = {2, 6, 10} $B \subseteq A$

EXAMPLE: True or False, is the set a subset?

1. $\{3, 4, 5, 6\} \subseteq \{2, 3, 4, 5, 6\}$ True

2. $\{1, 2, 3\} \subseteq \{2, 3, 4, 5\}$ False

3. $\{5, 6, 7, 8\} \subseteq \{5, 6, 7, 8\}$ True

Can be a subset of yourself. Can be equal

IV. A proper subsets is a subset but just **not equal** to itself.

To show a set is a proper subset use this symbol: $\subset$

EXAMPLE: decide if each is a subset or proper subset and which symbol to use.

1. {1, 2, 3} $\subseteq$ {1, 2, 3} subset
2. {1, 2, 3} $\subset$ {1, 2, 3, 4} subset and proper subset
3. {a, b, c, d} $\subset$ {a, b, c, d, e, f, g} subset and proper subset

V. Number of subsets in a set

The number of possible subsets that can be made from a single set follows this simple formula: 2^n n is the number of elements in the set

$2^n - 1$ is the number of proper subsets

EXAMPLE: List all the possible subsets.
THINK.....How many combinations can you make?

Set A = {1, 2, 3}

How many total possible subsets? $2^n = 2^3 = 8$

How many proper subsets? $2^3 - 1 = 7$

List all the subsets from set A:

$\{1\}$ $\{1,2\}$ $\{1,2,3\}$

$\{2\}$ $\{1,3\}$ $\emptyset$

$\{3\}$ $\{2,3\}$