Unit One: Set Theory

1.1: Types of Sets and Set Notation

Set: A collection of distinct objects

ex. $W = \{0, 1, 2, 3, \ldots\}$

W = set of whole numbers

element: an object in a set

Subset: smaller set belonging to a larger set.

example: Let D = all digits
Let E = all even digits

'E' is a subset of 'D'

$E \subset D$ * all elements of E are in D

Universal Set: all elements in a particular context.

In the example above, D is the universal set

Complement: elements that do not belong to a set.

* we use the symbol prime $'$

example: universal set S
complement S'

example: E = even numbers

$E = \{2, 4, 6, 8, \ldots\}$

element 3 belongs to the complement of E, or E'.

Empty Set: no possible elements

ex: odd numbers divisible by 2.

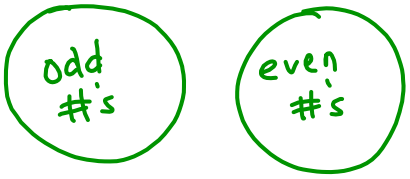
ex. the weeks with 8 days

empty set is denoted by $\varnothing$ or $\{\}$

↑ most common

Disjoint Sets: sets having no elements in common

ex: all odd numbers
all even numbers



Infinite set: has an infinite number of elements. (3 dots at the end)

ex. set of even numbers

$\{2, 4, 6, 8, \ldots\}$

Finite Set: a set with a countable number of elements

$E = \{2, 4, 6\}$

Mutually Exclusive: two or more events that cannot happen at the same time.

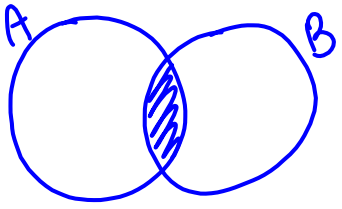
ex: the sun setting & rising

Intersection of sets: elements that are in both sets.

Denoted by;

$A \cap B$

Set A intersect B

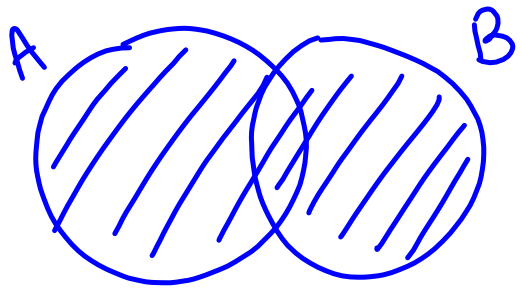


Union of Sets: all elements in all sets

Denoted by:

$A \cup B$

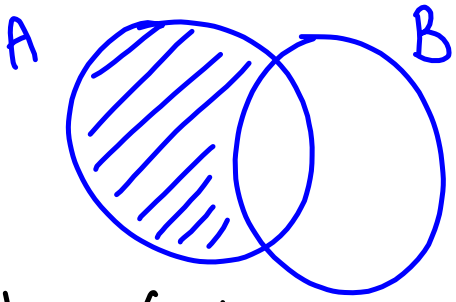
Set A union B



Couple more symbols;

$A \setminus B$ or $A - B$ $\Rightarrow$ means elements in 'A' but not in 'B'

(comma)



$n(A) \Rightarrow$ number of elements

$A = \{3, 4, 5, 6, 7\}$ $n(A) = 5$