Sets

elements in the sets：不重复，无顺序

Practice:

1 Let A be the set of letters in the word VENN and B be the set of letters in the word DIAGRAM.
  a List the elements of A and B.

" | " or " : " read as 'such that'；后接条件

"$a \in A$" a belongs to A

"$a \notin A$" a does not belongs to A

"$A \subseteq B$" & "$B \supseteq A$" A is B's subset ; B is A's superset

set A is always a subset of itself

empty set $\varnothing$ is always a subset for any set.

Special case of subset : $A \subseteq B$ and $A \neq B \rightarrow A \subset B$, (A is B's proper set).

"$|A|$" (Cardinality) → numbers of elements in set A

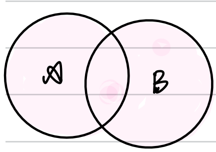
Practice:

if $B = \{a, b, c\{1, 2\}\}$, then what is $|B|$?

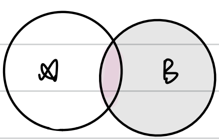
answer : 4

"2^A" represents the number of A's subset (not proper set !) $|2^A| = 2^{|A|}$

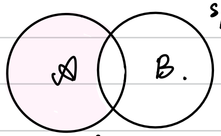
power set : the set of all the subset of A. denoted as 2^A or $P(A)$.



$A \cup B$.

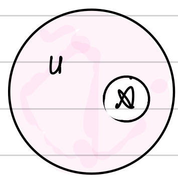


$A \cap B$.



$A \setminus B$ (or $A - B$)

special case, when $B \subseteq A$



$A^c = U/A$

$\mathbb{N}$ natural numbers

$\mathbb{Z}$ integers

$\mathbb{Q}$ rational numbers

$\mathbb{R}$ real numbers

$\varnothing$ empty set

e.g. $U = \mathbb{R}$, $(-1, 1)^c = (-\infty, -1] \cup [1, \infty)$

Cartesian Product : Combine set A, B, Cartesian Product $A \times B = \{(x, y) \mid x \in A, y \in B\}$

: 有顺序要求，依次排列组合.

Logic

对任意 for all $\forall$

存在 exist $\exists$

"$\wedge$" = and，需左右两种情况同时满足

"$\vee$" = or 左右情况满足任一即可

· Negation $\neg p$ is the negation of p. ：改变$\exists$/$\forall$ 及后置范围

Practice

if $p: \exists x \in \mathbb{R}, x^2+1<0$ then $\neg$