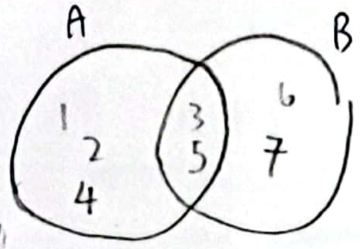
intersection:

- The set of all the elements which are common to both sets (A and B)
- Denoted by (∩)

Example 1: If A and B intersect each other, their intersection will be $A \cap B$.

Example 2:



As 3 and 5 are common to both sets, and lie in the intersection of A and B ⟹

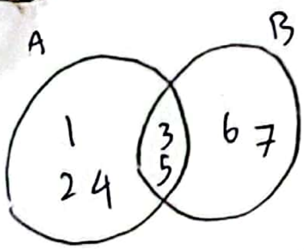
$A \cap B = \{3,5\}$

↑
read as
'A intersect B'

Union:

- The set of all elements which are in either one of the two sets
- Denoted by (∪)

Example:



List all the elements in A or B together ⟹ {1, 2, 3, 4, 5, 6, 7}

$\therefore A \cup B = \{1,2,3,4,5,6,7\}$

↑
read as
'A union B'

Scanned with CamScanner

Shading of sets (Tricks)

- $\cup$ = 1ticks ≤
- $\cap$ = 2ticks
- $(\cap)'$ 2ticks >
- $(\cup)' = 0$

Venn Diagrams

Universal Set (ξ): Set which contains all the possible elements under consideration for a particular situation

E.g. $A = \{2, 3, 5, 7\}$

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

$C = \{2, 4, 6, 8, 10, 12\}$

B can be the universal set of A but cannot be the universal set of C, as B has all the possible elements in A, but the element 12 is not in B

Subset signs

Equality $=$

Subset $\subseteq$

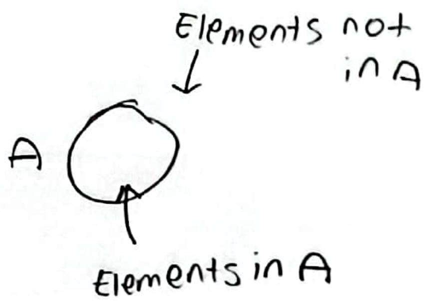
Proper subset $\subset$

Superset $\supseteq$

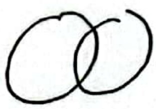
Proper superset $\supset$

Intersection $\cap$

Union $\cup$



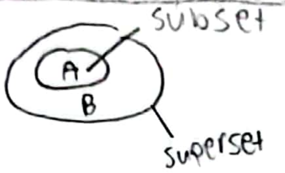
E.g.

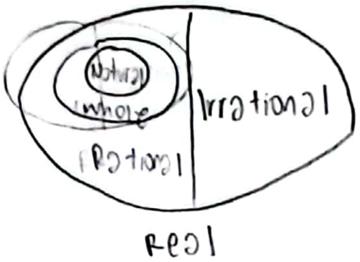
$A = \{1, 2, 3\}$  $B = \{2, 3, 4\}$

$\therefore A \cup B = \{1, 2, 3, 4\}$ $\therefore A \cup B = \{x \mid x \subset A \text{ or } x \subset B\}$

Subsets and Supersets

$A \subseteq B$

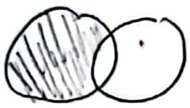




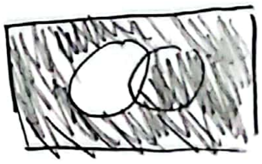
Natural $\subseteq$ whole $\subseteq$ Rational

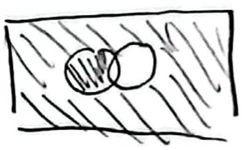
Rational + Irrational = Real no Set

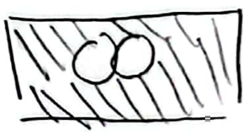
New!

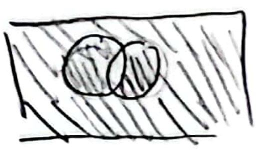
$A \cap B'$ 

$B \cap A'$ 

$A' \longrightarrow$ 

$B' \longrightarrow$ 

$(A \cup B)'$ or $[A' \cap B']$ 

$(A \cap B)'$ or $[A' \cup B']$ 

{Set Language}

$\emptyset$ = {set with no numbers}

N = {natural numbers} → positive integers (whole no.s) and sometimes 0

Z = {integers}

Q = {rational numbers}

R = {real numbers}

C = {complex numbers}

e.g. $1 \in N$

$\frac{1}{2} \notin N$

* $\in$: an element of

$\notin$: not an element of

$A = \{1, 2, 3\}$*

(elements / members) must be unique.

$\{3, 4, 5, ..., 100\}$

ellipsis to emphasise infinite sets

$N = \{1, 2, 3 ...\}$

$Z = \{..., -3, -2, -1, 0, 1, 2, 3, ...\}$

* $A = \{1, 2, 3\} \Rightarrow A$ {natural numbers less than four}

x = any element of A

A = {natural numbers less than four}

$A = \{x \boxed{|} x \in N, x < 4\}$

colon or vertical bar

A is the set of all elements, x, such that x is a natural numbers and is less than 4

A = {1, 2, 3}   B = {2, 3, 1}

$\boxed{A}$ $\boxed{B}$

$\therefore A = B$

The order ~~of the~~ in which the elements in a set is listed, is irrelevant

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

$A = B$

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

1 2 3

2 3 1

Subset

E.g. 1

A $\boxed{1\ 2\ 3}$

B $\boxed{1\ 2\ 3\ 4}$

$\therefore$ A is a [proper] subset of B $\Rightarrow$ proper subset: $\subset$

$\therefore A \subset B$

E.g. 2

A $\boxed{1\ 2\ 3\ 4}$

B $\boxed{1\ 2\ 3\ 4}$

$\therefore A \subseteq B$

$B \subseteq A$

E.g.

$\emptyset$ $\boxed{}$ only subset of every set

$\emptyset \subseteq \emptyset$

$\emptyset \subseteq A$ $\emptyset \subseteq B$

A $\boxed{1\ 2\ 3}$ B $\boxed{Z\ X}$