Unit 1: Sets of Number

Different ways to describe a set:

- different sets
- set relation/subsets

① Listing:

ex. $A = \{1, 3, 5, 7, 9, \ldots\}$

elements of the set

$\ldots$ there's an infinite amount of elements

$-3 \notin A$

doesn't belong to

$3 \in A$

"belongs to"

$10 \notin B$

$B = \{\ldots -3, -1, 1, 3, \ldots\}$

$C = \{3, 6, 9, 12\}$ finite set

$D = \{4, 8, \ldots, 20, 24\}$

Important Master Set

$\mathbb{N} = \{0, 1, 2, 3, 4 \ldots\}$

Natural numbers are whole positive numbers.

$-1 \notin \mathbb{N}$ $2.5 \notin \mathbb{N}$

$\mathbb{Z} = \{\ldots -2, -1, 0, 1, 2 \ldots\}$

$-1.5 \notin \mathbb{Z}$

the integers are positive and negative whole numbers.

$\mathbb{Q} = \{\ldots -50, \ldots -4, -\frac{1}{2}, \ldots 0 \ldots 2, \frac{3}{4} \ldots\}$

The Rational numbers

$\mathbb{Q}' = \{\ldots \pi \ldots \sqrt{2} \ldots \frac{1}{3} \ldots e \ldots\}$

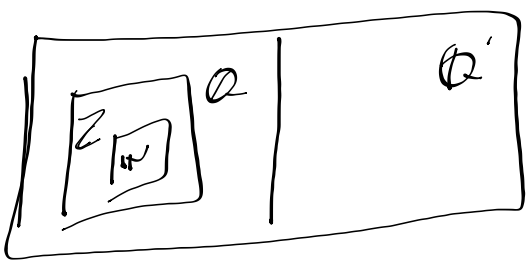
The irrational numbers

3.14

$\mathbb{R} = \{\ldots -10, -9, -\pi, -\sqrt{2}, 0, 1, \frac{1}{3}, \ldots\}$

The Real numbers + all the number
. any old number
. all the #'s in history

touch



② Set Builder Notation

$C = \{2, 3, 4, 5, 6\}$

$C = \{ x \in \mathbb{N} \mid 2 \leq x \leq 6 \}$

where x comes from. condition/rule that x follows

C is a set of that x belong the such natural that x is greater element to number

C is finite

$10 \notin C$

$3.5 \notin C$

$D = \{ x \in \mathbb{R} \mid 2 \leq x \leq 6 \}$ ✓

$3.5 \in D$

D is infinite

$D = \{2, 4, 6\}$ $D = \{x \in \mathbb{N} \mid 2 \leq x \leq 6 \text{ and } x \text{ is even}\}$

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e.x. Write the following set in set Builders Notation

$A = \{-1, 0, 1, 2, 3, 4\}$

$A = \{x \in \mathbb{Z} \mid -1 \leq x \leq 4\}$

$A' = \{x \in \mathbb{Z} \mid -2 < x \leq 4\}$

$-2 \notin A'$

$A'' = \{x \in \mathbb{R} \mid -2 < x \leq 4\}$

$A = A' \neq A''$

$B = \{7, 8, 9, 10, 11\}$

Which sets correspond to the above set?

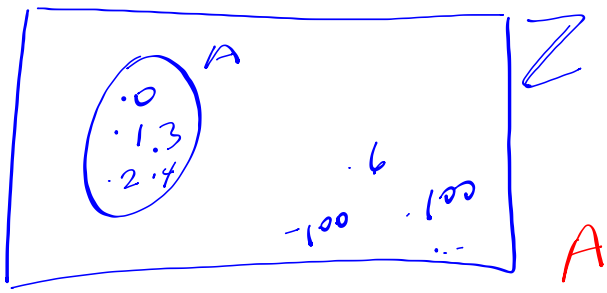
i $B = \{x \in \mathbb{N} \mid 7 \leq x \leq 11\}$ ✓

ii $B = \{x \in \mathbb{N} \mid 6 < x \leq 11\}$ ✓

iii $B = \{x \in \mathbb{Z} \mid 6 < x < 12\}$ ✓

iv $B = \{x \in \mathbb{Q} \mid 7 \leq x < 12\}$ ✗

(3) Venn Diagrams (a graphical way of representing a set)



set builders notation

$A = \{x \in \mathbb{Z} \mid 0 \leq x \leq 4\}$

listing

$A = \{0, 1, 2, 3, 4\}$

$A = \{ x \in \mathbb{Z} \mid x \geq -3 \}$

$A = \{ -3, -2, -1, 0, 1, 2, \ldots \}$

lowest number

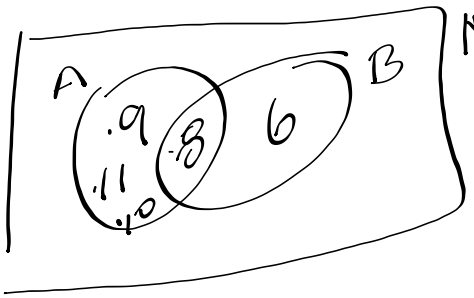
highest number

↳ write in set builder notation

$A = \{ x \in \mathbb{Z} \mid -3 \leq x < 00 \}$

$B = \{ x \in \mathbb{N} \mid 3 < x \leq 7 \}$ $B = \{ 4, 5, 6, 7 \}$

↳ write a list



write A and B

$A = \{ 8, 9, 10, 11 \}$

$A = \{ x \in \mathbb{N} \mid 8 \leq x \leq 11 \}$

$B = \{ 6, 9 \}$

$B = \{ x \in \mathbb{N} \mid 6 \leq x \leq 8 \text{ but not } 7 \}$

Unit 2: Set Relations: Subsets.

$A = \{1, 2, 4, 8, 20\}$

$B = \{1, 2, 20\}$

$C = \{1, 5, 10\}$

$B \subseteq A$ True

B is a subset of A because every element of B can found in A.

$1 \subseteq C$ (doesn't make sense!)

$A \nsubseteq B$

$C \nsubseteq A$

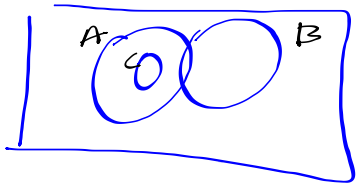
$10 \notin A$

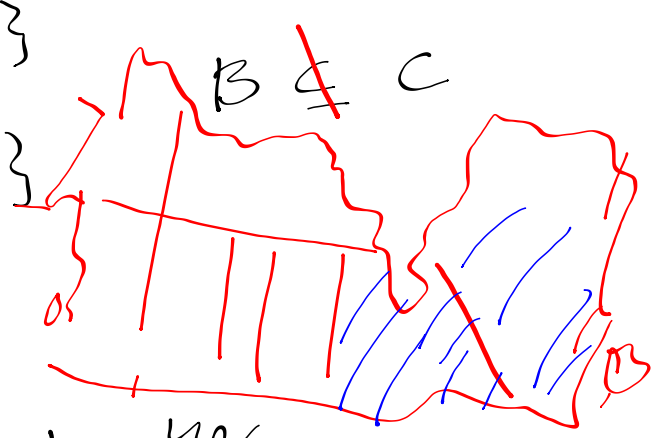
$A = \{\text{canadians}\}$

$B = \{\text{ontarians}\}$

$C = \{\text{québécois}\}$

$C \subseteq A$
$B \nsubseteq A$





$B \subseteq A$ True

$C \subseteq A$ effectivement non, yk yes

Some Definitions that I've neglected
-Shannon the Queen

• prime numbers

$\{1, 2, 3, 5, 7, 11, 13, 17 \ldots\}$

↳ a # that can't be divided by anything but itself and one.

• cardinal number of a set

ex. $A = \{1, 2, 3, 4\}$ $CN = 4$

• The empty set ↳ a set w/ no elements

$\{\}$ $\{\emptyset\}$ $\emptyset$

$\emptyset \subseteq A$
↳ the empty set can be a subset of any set.