



❖ Difference of sets :

→ A difference of two sets is the elements in one set that are **NOT** in the other.

→ For sets A , B , the ***difference of A and B***, written $A - B$, is the set of all elements that are in A but not B .

$$\begin{aligned} \rightarrow A - B &\equiv \{x \mid x \in A \wedge x \notin B\} \\ &= \{x \mid (x \in A \rightarrow x \in B)\} \end{aligned}$$

Also called:

The ***complement of B with respect to A***.

$$\begin{aligned} \rightarrow \mathbb{Z} - \mathbb{N} &= \{\dots, -1, 0, 1, 2, \dots\} - \{0, 1, \dots\} \\ &= \{x \mid x \text{ is an integer but not a nat. \#}\} \\ &= \{x \mid x \text{ is a negative integer}\} \\ &= \{\dots, -3, -2, -1\} \end{aligned}$$

→ Further Examples

- $\{1, 2, 3\} - \{3, 4, 5\} = \{1, 2\}$
- $\{\text{New York, Washington}\} - \{3, 4\} = \{\text{New York, Washington}\}$
- $\{1, 2\} - \emptyset = \{1, 2\}$
- The difference of any set S with the empty set will be the set S