Subsets

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Definition

Suppose that A and B are sets.

- If every element of A is also an element of B, then we say that A is a **subset** of B. This can be written using the subset symbol $A \subseteq B$.
- If at least one element of A is not an element of B, then A is not a subset of B. This can be written $A \not\subseteq B$.

Example

- $\{2, 3, 7\} \subseteq \{2, 3, 4, 5, 6, 7\}$

- $\{2, 3, 11\} \not\subseteq \{2, 3, 4, 5, 6, 7\}$

Example

- $\mathbb{N} \subseteq \mathbb{Z}$
- $\mathbb{Z} \subseteq \mathbb{Q}$

Example

- $\mathbb{R} \times \mathbb{N} \subseteq \mathbb{R} \times \mathbb{R}$

Example

- $\mathbb{N} \times \mathbb{R} \not\subseteq \mathbb{R} \times \mathbb{N}$

Example

- For any set A, $A \subseteq A$.

The Empty Set

- The empty set is a subset of every set.