Sets: Basics and Vocabulary

Video companion

1 Set theory basics

- What is a set?
- Cardinality (size)
- Intersections
- Unions

2 What is a set?

Vocab: A *set* is made up of *elements*.

Example: $A = \{1, 2, -3, 7\}$ and $E = \{\text{apple, monkey, Daniel Egger}\}$

- $2 \in A$: "2 is an element of A"
- $8 \notin A$: "8 is NOT an element of A"

3 Cardinality

Vocab: The *cardinality* (size) of a set is the number of elements in it.

- $|A| = 4$ (there are 4 elements in A, so the cardinality is 4)
- $|E| = 3$ (there are 3 elements in E, so the cardinality is 3)

4 Intersections

The *intersection* is defined as elements that are in both sets.

Symbol $\cap$: "intersects" (and)

Example: $A = \{1, 2, -3, 7\}$ and $B = \{2, -3, 8, 10\}$ and $D = \{5, 10\}$

- $A \cap B = \{2, -3\}$
- $B \cap D = \{10\}$

In general, $A \cap B = \{x \in A \text{ and } x \in B\}$

If there are no elements in common, the answer is the empty set $\emptyset$. The cardinality of the empty set $|\emptyset| = 0$.

- $A \cap D = \{\emptyset\}$

5 Unions

The *union* is defined as elements that are in either set.

Symbol $\cup$: "union" (or)

Example: $A = \{1, 2, -3, 7\}$ and $B = \{2, -3, 8, 10\}$ and $D = \{5, 10\}$

- $A \cup B = \{1, 2, -3, 7, 8, 10\}$
- $A \cup D = \{1, 2, -3, 7, 5, 10\}$

In general, $A \cup B = \{x \in A \text{ or } x \in B\}$.