

# 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,  $A \cap B = \{x : x \in A \text{ and } x \in B\}$

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