Definition

Let $\mathcal{R} \subseteq A \times A$ be a relation on A. We say that $\mathcal{R}$ is:

- **reflexive** if $\forall x \in A, (x, x) \in \mathcal{R}$;
- **symmetric** if $\forall x, y \in A, (x, y) \in \mathcal{R} \implies (y, x) \in \mathcal{R}$;
- **transitive** if $\forall x, y, z \in A, [(x, y) \in \mathcal{R} \wedge (y, z) \in \mathcal{R}] \implies (x, z) \in \mathcal{R}$.

Definition

An **equivalence relation** is a relation that is reflexive, symmetric, and transitive.

We often denote an equivalence relation by $\sim$
(LaTeX: `\sim`)