Set Theory Basics and Notation

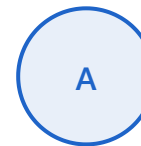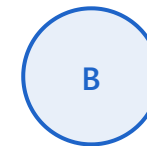|	
Set:	Collection of distinct objects $X = \{x_1, x_2, ..., x_n\}$
Common sets:	$\mathbb{R}$ (real numbers) $\mathbb{R}^n$ (n-dimensional space)
Membership:	$x \in X$ means "x belongs to set X"
Subset:	$A \subseteq B$ means all elements of A are in B
Operations:	Union ($\cup$), Intersection ($\cap$) Complement (')
Cartesian product:	$X \times Y = \{(x,y) \mid x \in X, y \in Y\}$

Set Operations

A ∪ B Union   **A ∩ B** Intersection

ML Application

Data points live in feature space $\mathbb{R}^n$

Example: Image data $\rightarrow \mathbb{R}^{784}$ (28×28 pixels)

Sets define **domains** for regression functions

Sets define domains for our regression functions