Connection between sets and propositions

- Let P, Q be propositional functions on U;
- $A = \{x \in U : P(x) \text{ is true}\}$;
- $B = \{x \in U : Q(x) \text{ is true}\}$;
- Then:

$$\begin{aligned} A \cap B &= \{x \in U : (x \in A) \wedge (x \in B)\} \\ &= \{x \in U : (P(x) \text{ is true}) \wedge (Q(x) \text{ is true})\} \\ &= \{x \in U : (P(x) \wedge Q(x)) \text{ is true}\}. \end{aligned}$$