



Why

How does the power set relate to a union?

Notation preliminaries

Let E denote a set. Let \mathcal{A} denote a set of subsets of the set denoted by E . We define $\bigcup_{A \in \mathcal{A}} A$ to mean $\bigcup \mathcal{A}$.

Basic properties

Here are some basic interactions between the powerset and unions.¹

Proposition 1. $\mathcal{P}(E) \cup \mathcal{P}(F) \subset \mathcal{P}((E \cup F))$

Proposition 2. $\bigcup_{X \in \mathcal{C}} \mathcal{P}(X) \subset \mathcal{P}((\bigcup_{X \in \mathcal{C}} X))$

Proposition 3. $E = \bigcup \mathcal{P}(E)$

Proposition 4. $\mathcal{P}((\bigcup E)) \supset E$.

Typically $E \neq \mathcal{P}((\bigcup E))$, in which case E is a proper subset.

¹Future editions will expand on these propositions and provide accounts of them.

