



## Why

If all sets considered in a union or intersection are subsets of a fixed set, then the union and intersection of any set of sets is well defined. We can then derive generalized version of DeMorgan's laws.<sup>1</sup>

## New notation

Let  $E$  denote a set. Let  $\mathcal{A}$  denote a set of subsets of  $E$ . Then define

$$\bigcup_{A \in \mathcal{A}} A := \bigcup \mathcal{A}, \quad \bigcap_{A \in \mathcal{A}} A := \bigcap \mathcal{A}.$$

In this case we have

**Proposition 1.**  $C(\bigcup_{A \in \mathcal{A}} A) = \bigcap_{A \in \mathcal{A}} C(A)$ .

**Proposition 2.**  $C(\bigcap_{A \in \mathcal{A}} A) = \bigcup_{A \in \mathcal{A}} C(A)$ .

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<sup>1</sup>In future editions, this sheet may not exist.



