Why

We divide a set into disjoint subsets whose union is the whole set. In this way we can handle each subset of the main set individually, and so handle the entire set piece by piece.

Decomposing a set

Two sets A and B *divide* a set X if $A \cup B = X$ and $A \cap B = \varnothing$. Although every element is in either A or B, no element is in both.

If $\mathcal{A}$ is a set of sets, and $A, B \in \mathcal{A}$, then $\mathcal{A}$ is *pairwise disjoint* if $A \cap B = \varnothing$ whenever $A \neq B$.

Definition

A *partition* (or *decomposition*, *set partition*) of a set X is a set of *nonempty*, *pairwise disjoint*, subsets of X whose union is X. We call the elements of a partition the *parts* (or *pieces*, *blocks*, *cells*) of the partition.

When speaking of a partition, we commonly call the set of sets *mutually exclusive* (or *non-overlapping*), by which we mean that they are pairwise disjoint, and *collectively exhaustive*, by which we mean that their union is full set.[1]

Other terminology

Occasionally, the term *unlabeled partition* is used, and the term *partition* is reserved for a separate concept. In this case, the term *allocation* is sometimes used as an abbreviation for unlabeled partition.

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[1]Future editions will include diagrams.

Partitions

Set Intersections   Set Unions

Pair Intersections   Empty Set   Unordered Pairs

Set Specification

Set Equality

Set Inclusion

Deductions

Quantified Statements

Logical Statements

Statements

Identities   Sets

Names

Letters   Objects