planetmath.org

Math for the people, by the people.

necessary and sufficient

Canonical name	NecessaryAndSufficient
Date of creation	2013-03-22 16:07:31
Last modified on	2013-03-22 16:07:31
Owner	Wkbj79 (1863)
Last modified by	Wkbj79 (1863)
Numerical id	12
Author	Wkbj79 (1863)
Entry type	Definition
Classification	msc 03B05
Classification	msc 03F07
Related topic	UniversalAssumption
Related topic	SufficientConditionOfPolynomialCongruence
Defines	necessary
Defines	necessity
Defines	sufficient
Defines	sufficiency

The statement "*p* is *necessary* for *q*" "*q* `http://planetmath.org/Implication`implies *p*".

The statement "*p* is *sufficient* for *q*" "*p* `http://planetmath.org/Implication`implies *q*".

The statement "*p* is *necessary and sufficent* for *q*" "*p* `http://planetmath.org/Iff`if and only if *q*".

For an example of how these terms are used in mathematics, see the entry on complete ultrametric fields.

Biconditional statements are often proven by breaking them into two implications and proving them separately. Often, the terms *necessity* and *sufficiency* are used to indicate which implication is being proven. For an example of this usage, see the entry called relationship between totatives and divisors.