

Equivalent Characterizations of the Conditional Statement

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Equivalent Characterizations of the Conditional Statement

The following statements are (logically) equivalent. In each, p represents the hypothesis and q represents the conclusion.

$$p \rightarrow q$$

p implies q

If p then q i.e. If p (is true), then q (is true).

p only if q i.e. p (is true) only if q (is true)

p is sufficient for q i.e. The fact that p is true is **sufficient** to guarantee that q is true

q if p i.e. q (is true) if p (is true)

q is necessary for p i.e. In order for q to be true, it is necessary for p to be true.

Equivalent Characterizations of the Biconditional Statement

The following statements are (logically) equivalent:

$$p \longleftrightarrow q$$

$$(p \rightarrow q) \wedge (q \rightarrow p)$$

p if and only if q i.e. p (is true) if q (is true), and p (is true) only if q (is true). **Note:** p is true exactly when q is true.

p is necessary and sufficient for q i.e. p is **necessary** for q to be true, and p is **sufficient** for q to be true.