Conjunctive Normal Form

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A statement is in conjunctive normal form if it is a conjunction (sequence of ANDs) consisting of one or more conjuncts, each of which is a disjunction (OR) of one or more literals (i.e., statement letters and negations of statement letters; Mendelson 1997, p. 30). Examples of conjunctive normal forms include

$$A \tag{1}$$
$$(A \vee B) \wedge (!\,A \vee C) \tag{2}$$
$$A \vee B \tag{3}$$
$$A \wedge (B \vee C), \tag{4}$$

where $\vee$ denotes OR, $\wedge$ denotes AND, and ! denotes NOT (Mendelson 1997, p. 30).

Every statement in logic consisting of a combination of multiple $\wedge$, $\vee$, and !s can be written in conjunctive normal form.

An expression can be put in conjunctive normal form using the Wolfram Language using the following code:

```
ConjunctiveNormalForm[f_] :=
 Not[LogicalExpand[Not[f]]] //. {
  Not[a_Or] :> And @@ (Not /@ List @@ a),
  Not[a_And] :> Or @@ (Not /@ List @@ a)
 }
```

SEE ALSO

AND, Disjunctive Normal Form, Literal, Negation, Normal Form, OR, Statement Letter

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SUBJECT CLASSIFICATIONS

Foundations of Mathematics › Logic › General Logic ›

History and Terminology › Mathematica Code ›

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