

Mathematical logic :

Logic : Study of correct reasoning or good arguments

Propositional logic : \rightarrow Proposition Sentence

A proposition is a declarative sentence (that is, a sentence that declares a fact) that is either true or false, but not both.

True False

Ex) Jalandhar is in ^{Punjab} Patna. 100% False It is a proposition.

Ex) $2+3=5$ 100% True It is a proposition.

Ex) $x+3=7$ $x=7-3=4$
 \rightarrow True if $x=4$ $\boxed{x=4}$
 \rightarrow False if $x \neq 4$

$x+3=7$; $x > 4$
 for $x > 4$ It is false Proposition.

1. Washington, D.C., is the capital of the United States of America.
2. Toronto is the capital of Canada.
3. $1+1=2$.
4. $2+2=3$. — False

$$2+2=4 \neq 3$$

It is a proposition

1. What time is it? \rightarrow Not Declarative. Not a proposition.
2. Read this carefully. \rightarrow
3. $x+1=2$.
4. $x+y=z$.

$$\underline{x+y=z} \quad x=1, y=1, z=5$$

Proposition

$$\underline{1+1=5} \quad \underline{2=5} \quad \left. \begin{array}{l} \text{Not True} \\ \text{False} \end{array} \right\}$$

Propositional Variable (Statement Variable) : \rightarrow

\textcircled{p} : $1+1=3$

\textcircled{q} : $x+y=z$

\textcircled{r} : $x+3=7$

Truth Value of P. Variable : The truth value of a proposition is True, denoted by T if it is false, denoted by F

T — True F — False.

The area of logic which deal with proposition is called Propositional Calculus or propositional logic.

Propositional Calculus or propositional logic.

Compound Proposition \rightarrow

Compound Sentence
Compound Statement