

Section 1.6: Validity of Arguments

An argument is a series of statements (premises) that support a valid (or invalid) conclusion.

Example of an Argument

Major Premise: $\underbrace{\text{If you go to the game, then you will have a good time.}}_P$ $\underbrace{\text{Q}}$
 Minor Premise: $\underbrace{\text{You went to the game.}}_P$
 Conclusion: $\underbrace{\text{There for you had a good time.}}_Q$

Write each part of the argument in symbolic logic.

Major premise: $P \rightarrow Q$

Minor premise: P

Conclusion: Q

To test for argument validity, create a truth table for: $((P \rightarrow Q) \wedge P) \rightarrow Q$

\swarrow MAJOR PREMISE
 \swarrow MINOR
 \swarrow CONCLUSION!
 \uparrow AND
 \uparrow IF-THEN

P	Q	$P \rightarrow Q$	$((P \rightarrow Q) \wedge P)$	$((P \rightarrow Q) \wedge P) \rightarrow Q$
T	T	T	T	T
T	F	F	F	T
F	T	T	F	T
F	F	T	F	T

\checkmark (above P) \checkmark (above $P \rightarrow Q$)
TAUTOLOGY
 VALID ARGUMENT!

Is the argument below a valid or invalid argument?

P
If you love me, then you will buy me a diamond.

$\sim Q$
You did not buy me a diamond.

Therefore, you do not love me.
 $\sim P$

MAJOR PREMISE: $P \rightarrow Q$

MINOR PREMISE: $\sim Q$

CONCLUSION: $\sim P$

TRUTH TABLE: $[(P \rightarrow Q) \wedge \sim Q] \rightarrow \sim P$

P	Q	$\sim P$	$\sim Q$	$(P \rightarrow Q)$	$[(P \rightarrow Q) \wedge \sim Q]$	$[(P \rightarrow Q) \wedge \sim Q] \rightarrow \sim P$
T	T	F	F	T	F	T
T	F	F	T	F	F	T
F	T	T	F	T	F	T
F	F	T	T	T	T	T

GO BUY A RING!

Forms of Valid Arguments

$$\begin{array}{l} 1. \quad P \rightarrow Q \\ \quad \quad P \\ \hline \therefore Q \end{array} \left. \vphantom{\begin{array}{l} P \rightarrow Q \\ P \\ \hline \therefore Q \end{array}} \right\} \text{VALID!}$$

"MODUS PONENS" ARGUMENT

"IN A MANNER THAT ASSERTS."

$$\begin{array}{l} 2. \quad P \rightarrow Q \\ \quad \quad \sim Q \\ \hline \therefore \sim P \end{array} \left. \vphantom{\begin{array}{l} P \rightarrow Q \\ \sim Q \\ \hline \therefore \sim P \end{array}} \right\} \text{VALID!}$$

"MODUS TOLLENS" ARGUMENT

"IN A MANNER THAT NEGATES"

Forms of Invalid Arguments

$$\begin{array}{l} 1. \quad P \rightarrow Q \\ \quad \quad Q \\ \hline \therefore P \end{array} \left. \vphantom{\begin{array}{l} P \rightarrow Q \\ Q \\ \hline \therefore P \end{array}} \right\} \text{INVALID!}$$

CONVERSE FALLACY

$$\begin{array}{l} 2. \quad P \rightarrow Q \\ \quad \quad \sim P \\ \hline \therefore \sim Q \end{array} \left. \vphantom{\begin{array}{l} P \rightarrow Q \\ \sim P \\ \hline \therefore \sim Q \end{array}} \right\} \text{INVALID!}$$

INVERSE FALLACY