

RULES OF INFERENCE

ABOUT

In this short section, we will look at some simple rules of logic.

1. RULES OF INFERENCE

Modus Ponens (“mode that affirms by affirming”¹)

Rule	English translation
$p \rightarrow q$	If p is true, then q is true
p	p is true
$\therefore q$	Therefore, q is true

¹ https://en.wikipedia.org/wiki/Modus_ponens

Notes

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Modus Tollens (“mode that denies by denying”¹)

Rule	English translation
$p \rightarrow q$	If p is true, then q is true
$\neg q$	q is false
$\therefore \neg p$	Therefore, p is false

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¹ https://en.wikipedia.org/wiki/Modus_tollens

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Addition

Rule	English translation
p	p is true
$\therefore p \vee q$	Therefore p is true or q is true

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Simplification

Rule	English translation
$p \wedge q$	p is true and q is true
$\therefore p$	Therefore p is true

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Conjunction

Rule	English translation
p	p is true
q	q is true
$\therefore p \wedge q$	Therefore, p is true and q is true

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Hypothetical syllogism

Rule	English translation
$p \rightarrow q$	If p is true, then q is true
$q \rightarrow r$	If q is true, then r is true
$\therefore p \rightarrow r$	Therefore, if p is true, then r is true

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Disjunctive syllogism

Rule	English translation
$p \vee q$	p is true or q is true
$\neg p$	p is not true
$\therefore q$	Therefore, q is true

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CONCLUSION

Next we will be talking about predicates – another type of structure we can use with propositional logic. A predicate is essentially a function that takes in some input, and returns a propositional value – either **true** or **false**.