

Argument: Two or more declarative sentences/propositions, one or more of which (the premises) are claimed to provide reasons to believe, (or support for), one of the other propositions (the conclusion).

Premise Indicators	Conclusion Indicators
Since	therefore
Because	hence
for/for one thing	thus/ergo
for the reason that	so
follows from	follows that
inasmuch as	consequently
as shown by	which entails that
given that	which proves that
seeing that	which implies that
owing to	necessarily
seeing that	must be the case that
as/as indicated by	which means that
assuming that	demonstrates that
considering that	we can conclude that
	as a result

Valid truth-functional argument forms:

Disjunctive syllogism: p or q , not p , therefore, q

Modus ponens: If p then q , p , therefore, q

Modus tollens: If p then q , not q , therefore, not p

Chain argument: If p then q , if q then r , therefore, If p then r

Constructive dilemma: Either p or q , if p then r , if q then s , therefore, either r or s .

If and only if argument: p if and only if q , q , therefore p

Invalid truth-functional forms:

p or q , p , therefore not q

Denying the antecedent: If p then q , not p , therefore not q

Affirming the consequent: If p then q , q , therefore p

Some common English expressions and their truth functional equivalents:

p only if q = If p then q , (Another equivalent is: If not q then not p)

p if q = If q then p

p unless q = p or q , (Also: if not q then p) (Also: if not p then q)

p given that q = If q then p

Assuming that p , q = If p then q

Neither p nor q = Not (p or q), (Also, : not p and not q)

Not both p and q = Not (p and q), (Also: not p or not q)

Validity Exercises: Decide for each argument whether it is valid or invalid

1. p unless q , not p , thus, q
2. p if q , not q , thus, not p
3. p or q , q , thus, p
4. If p then q , q , thus, p
5. p only if q , not p , thus, not q

6. not (p and q), not p, thus, q
7. p if and only if q, q, thus p
8. p or q, p, thus, not q
9. p given that q, p, thus, q
10. Neither p nor q, thus, not p
11. p only if not q, q, thus, not p.
12. not p unless q, not q, thus, p.
13. If p then q, If p then r, thus, if q then r.
14. p unless not q, p, thus, q.

For each argument below, put it into standard truth functional form using the suggested letters to represent propositions and then determine whether the resulting argument is valid.

1. George must really love Cheryl. He called her 3 times yesterday, and he would do that only if he was in love with her. (G, C)
2. Anarchy would work if men were angels. Alas, they are not. So anarchy won't work. (A, M)
3. If the lights still work, the battery is not dead. The lights work. Thus, the battery is not dead.
4. Bob will show up unless he is ill. There Bob is now. He must not be ill.
5. The paper turns red if it's dipped in beer. It's turned red. Thus, it was dipped in beer.
6. Eastwood won't win unless Scorsese loses. But Scorsese will lose. So Eastwood will win.
7. Oswald killed Kennedy only if Fetzer's ideas are nutty. But Fetzer's ideas are nutty. Thus, Oswald killed Kennedy.

