Knowledge Check: Natural Deduction for Propositional Logic

TOTAL POINTS 4

1.	What rule can be used to derive (pAq) Λ r \vdash (pAq)?	1 / 1 point
	implication-elimination	
	and-elimination (1)	
	and-introduction	
	and-elimination (2)	
	Correct Correct! We can derive $(p \wedge q)$ from $(p \wedge q) \wedge r$ using and-introduction. The rule is called "and-elimination (1)" because we obtain the first part of the formula in $(p \wedge q) \wedge r$.	
2.	Which rules may be used to derive p $\rightarrow \neg \neg q$, p $\vdash q \land p$?	1 / 1 point
	double negation-elimination, and-introduction, and and-elimination	
	implication-elimination, implication-introduction, and and-introduction	
	o double negation-elimination, implication-elimination, and and-introduction	
	double negation-elimination, implication-elimination, and and-elimination	
	Correct Correct! To derive q∧p, we need and-introduction with both p and q. p is given and q can be derived by first applying implication-elimination and then double negation-elimination.	
3.		1 / 1 point

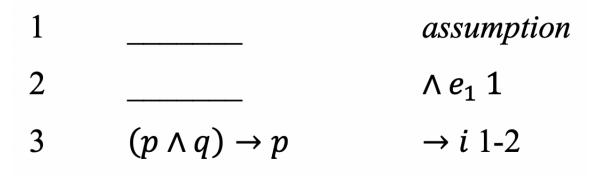


Figure 1: Derivation of $\vdash (p \land q) \rightarrow p$

Review the figure, which gives a partial derivation of \vdash (pAq) \rightarrow p. While the rules for deriving the conclusion have been written out, two steps of the proof are missing, specifically the ones in line 1 and line 2.

Given the rules required to derive the conclusion, which formulas are the missing steps for the proof?

- p in line 1, and (pAq) in line 2
- p in line 1, and $q \rightarrow p$ in line 2
- $(p \wedge q)$ in line 1, and $p \rightarrow q$ in line 2
- $(p \wedge q)$ in line 1, and p in line 2

Correct

Correct! To derive the conclusion, we need to apply implication-introduction, which requires us to make an assumption on (p \(\begin{aligned} n \) and derive p.\\

- Consider this argument: "If I am guilty, I must be punished; I must not be punished. Therefore, I am not guilty." Is the argument logically correct? If so, which rules are needed to derive the conclusion?
 - Yes, the argument is logically correct. We can use and-introduction, negationintroduction, and implication elimination.
 - Yes, the argument is logically correct. We can use negation-elimination, negationintroduction, and implication elimination.
 - No, the argument is *not* logically correct.

Yes, the argument is logically correct. We can use negation elimination, implication introduction, and implication elimination.

Correct

Correct! Negation-introduction allows us to make an assumption which must then allow us to derive the bottom. This can be done using negation-elimination combined with implication elimination.