Knowledge Check: Propositional Logic

TOTAL POINTS 3

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1. Which propositional formula can be considered well-formed? **1 / 1 point**

- (x) $(\neg(p \rightarrow (q \wedge p)))$
- ( ) $(\neg(\odot(q \vee p)))$
- ( ) $(\neg(p \rightarrow (q = p)))$
- ( ) $\vee pq$

Correct

Correct! In this formula, p and q are atoms, so they are considered well-formed formulas. As a result, their conjunction is also well formed. Similarly, "p implies the conjunction" is also well-formed, as the implication is a binary connective between two well-formed formulas. Finally, the negation of a well-formed formula is itself a well-formed formula.

2. Consider a propositional language where p means "Paola is happy", q means "Paola paints a picture", and r means "Renzo is happy". Which expression formalizes the sentence "Paola is happy only if she paints a picture"? **1 / 1 point**

- ( ) $p \wedge q \rightarrow \neg r$
- ( ) $p \rightarrow \neg q$
- (x) $\neg(p \wedge \neg q)$
- ( ) $\neg p \vee \neg q$

Correct

Correct! This option expresses the same meaning as the given sentence (which is essentially $p \rightarrow q$).

3. Assuming that the binding priority is $\neg$, $\wedge$, $\vee$, $\rightarrow$, how many distinct subformulas are there in "$p \rightarrow (\neg p \vee (\neg\neg q \rightarrow (p \wedge q)))$"?

- ○ 10
- ○ 6
- ○ 7
- ◉ 9

Correct

Correct! Drawing out the parse tree of the formula can help to demonstrate that p, $\neg p$, q, $\neg q$, $\neg\neg q$, $(p \wedge q)$, $\neg\neg q \rightarrow (p \wedge q)$, $\neg p \vee (\neg\neg q \rightarrow (p \wedge q))$ and $p \rightarrow (\neg p \vee (\neg\neg q \rightarrow (p \wedge q)))$ are all subformulas.