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Evaluation 1

Let A, B and C be three sets, and p, q and r be three propositions. For each of the following statement, say if it is TRUE or FALSE. (+1 if your answer is correct, -1 if your answer is wrong, 0 otherwise.)

1. The power set 2^A of a set A is never empty.

2. $A \cap B = \emptyset \to A \neq B$.

3. If $f : A \to B$, then $f(A) = B$.

4. If $f : A \to B$, then $f^{-1}(B) = A$.

5. $[(A \subseteq B) \wedge (B = f(A))] \to A = f^{-1}(B)$.

6. $[\neg((p \vee q) \to r)] \leftrightarrow [\neg(p \vee q) \to \neg r]$.

7. $((p \wedge \neg p) \vee (q \wedge (\neg q)) \to r$.

8. $\{1\} \in \{\{1, 2\}\}$.

9. $\emptyset \in 2^A$.

10. $\emptyset \subseteq 2^A$.

11. $\emptyset \subseteq (A \cap B)$.

12. $\{1, 2\} \in \{1, 2\}$

13. $\displaystyle\bigcap_{C \in \{\{\emptyset, \{1,2\}, \{1\}\}\}} C = \{1\}$.

14. $\displaystyle\bigcup_{C \in \{\{\emptyset, \{1,2\}, \{1\}\}\}} C = \{1, 2\}$.

15. "If it is raining then the world has a begining or the world has an end" if and only if "it is not raining or the world has a begining or the world has an end."

16. The negation of "If it is raining then the world has a begining or the world has an end" is "It is raining and the world has not begining nor end."

17. $A \cap (B \cup C) = (A \cup B) \cap (A \cup C)$.

18. $(x \in A) \wedge (x \in B) \wedge (x \notin A \cup B)$.

19. $(\forall A)(\forall B)((x \in A) \vee (x \in B)) \Rightarrow (x \in A \cap B)$.

20. $[(x \in A \setminus B) \vee (x \in B \setminus C)] \wedge [(x \in B \setminus A) \wedge (x \in C \setminus B)]$