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Evaluation 2

Grade: For each statement (+1 if your answer is correct, -2 if your answer is wrong, 0 otherwise.) For each of the following statements (1-11), say if it is TRUE or FALSE.

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

2. $A \subseteq B \Leftrightarrow A \in 2^B$.

3. $\emptyset \subseteq \emptyset$

4. $\{\emptyset\} \in \{\emptyset, \{a, b\}\}$.

   Let $x \in \mathbb{N}$, (for example x=3).

5. $x \in \{\mathbb{N}, \mathbb{R}\}$

6. $\{x\} \in \{\mathbb{N}, \mathbb{R}\}$

7. $\{x\} \subseteq \{\mathbb{N}, \mathbb{R}\}$

   Let X, Y, Z be three sets, $f : X \to Y$, $g : Y \to Z$.

8. If f is not injective then $g \circ f$ is not injective.

9. If g is surjective then $g \circ f$ is surjective.

   Let E, F be two sets, $A \in 2^E$ and $f : E \to F$. Let $f_{|A} : A \to F$ defined by $f_{|A}(a) = f(a)$, $\forall x \in A$.

10. f injective $\Rightarrow f_{|A}$ injective.

11. f surjective $\Rightarrow f_{|A}$ surjective.

    Let $A \in 2^E$ and $B \in 2^F$. Rewrite each of the following statements, using mathematical symbols (except the symbol $\neg$). Of course, it is not allowed to write the same proposition in both sides of the equivalence...

12. $y \in f(A) \iff$

13. $x \in f^{-1}(B) \iff$

14. f **is not** surjective $\iff$

15. f **is not** injective $\iff$