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3) Let A and B be sets. Prove the following: $\forall x (x \in A \rightarrow x \in A - (B - A))$.

1. $\forall x (x \in A \rightarrow x \in A - (B - A))$

Prove.

2. $x \in A$

Hypothesis Introduction.

3. $x \in A \rightarrow x \in A - (B - A)$

Universal Introduction, 1

4. $x \in A - (B - A)$

Modus ponens, 2, 3

5. $x \in A \wedge x \notin B - A \wedge x \notin$

Definition of " $-$ ", 4

6. $x \in A \wedge \neg x \in B - A$

Definition of negation, 5

7. $x \in A \wedge \neg x \in B \wedge \neg x \notin A$

Definition of " $-$ ", 6

8. $x \in A \wedge x \notin B \wedge x \in A$

Definition of negation, 7

9. $x \in A \wedge x \notin B$

Implication Law, 8

10. $x \in A - B$

Definition of " $-$ ", 9

11. $x \in A \rightarrow x \in A - B$

Hypothesis Elimination, 2, 10

12. $\forall x (x \in A \rightarrow x \in A - B)$

Universal Generalization, 11