

CS313K: Logic, Sets, and Functions

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(Lecture 21)

Summary

$$(\forall x: (p \wedge x) \wedge (q \wedge x)) \Leftrightarrow (\forall x: (p \wedge x)) \wedge (\forall x: (q \wedge x))$$

$\forall \quad \wedge \quad \Rightarrow$

$$\forall \quad \wedge \quad \rightarrow \quad \text{T} \quad ((p_1 \wedge q_1) \wedge (p_2 \wedge q_2)) \rightarrow ((p_1 \wedge p_2) \wedge (q_1 \wedge q_2))$$

$$\forall \quad \wedge \quad \leftarrow \quad \text{T} \quad ((p_1 \wedge q_1) \wedge (p_2 \wedge q_2)) \leftarrow ((p_1 \wedge p_2) \wedge (q_1 \wedge q_2))$$

$$\forall \quad \vee \quad \rightarrow \quad \text{F} \quad ((p_1 \vee q_1) \wedge (p_2 \vee q_2)) \rightarrow ((p_1 \wedge p_2) \vee (q_1 \wedge q_2))$$

$$\forall \quad \vee \quad \leftarrow \quad \text{T} \quad ((p_1 \vee q_1) \wedge (p_2 \vee q_2)) \leftarrow ((p_1 \wedge p_2) \vee (q_1 \wedge q_2))$$

$$\exists \quad \wedge \quad \rightarrow \quad \text{T} \quad ((p_1 \wedge q_1) \vee (p_2 \wedge q_2)) \rightarrow ((p_1 \vee p_2) \wedge (q_1 \vee q_2))$$

$$\exists \quad \wedge \quad \leftarrow \quad \text{F} \quad ((p_1 \wedge q_1) \vee (p_2 \wedge q_2)) \leftarrow ((p_1 \vee p_2) \wedge (q_1 \vee q_2))$$

$$\exists \quad \vee \quad \rightarrow \quad \text{T} \quad ((p_1 \vee q_1) \vee (p_2 \vee q_2)) \rightarrow ((p_1 \vee p_2) \vee (q_1 \vee q_2))$$

$$\exists \quad \vee \quad \leftarrow \quad \text{T} \quad ((p_1 \vee q_1) \vee (p_2 \vee q_2)) \leftarrow ((p_1 \vee p_2) \vee (q_1 \vee q_2))$$