

$$\begin{aligned}
& \text{T} \equiv \neg \text{F} & (1) \\
& \neg \text{T} \equiv \text{F} & (2) \\
& p \wedge \text{T} \equiv p & (3) \\
& p \vee \text{F} \equiv p & (4) \\
& p \vee \text{T} \equiv \text{T} & (5) \\
& p \wedge \text{F} \equiv \text{F} & (6) \\
& p \vee p \equiv p & (7) \\
& p \wedge p \equiv p & (8) \\
& \neg(\neg p) \equiv p & (9) \\
& p \vee q \equiv q \vee p & (10) \\
& p \wedge q \equiv q \wedge p & (11) \\
& (p \vee q) \vee r \equiv p \vee (q \vee r) & (12) \\
& (p \wedge q) \wedge r \equiv p \wedge (q \wedge r) & (13) \\
& p \vee (q \wedge r) \equiv (p \vee q) \wedge (p \vee r) & (14) \\
& p \wedge (q \vee r) \equiv (p \wedge q) \vee (p \wedge r) & (15) \\
& \neg(p \wedge q) \equiv \neg p \vee \neg q & (16) \\
& \neg(p \vee q) \equiv \neg p \wedge \neg q & (17) \\
& p \vee (p \wedge q) \equiv p & (18) \\
& p \wedge (p \vee q) \equiv p & (19) \\
& p \vee \neg p \equiv \text{T} & (20) \\
& p \wedge \neg p \equiv \text{F} & (21) \\
& p \rightarrow q \equiv \neg p \vee q & (22) \\
& p \rightarrow q \equiv \neg q \rightarrow \neg p & (23) \\
& p \vee q \equiv \neg p \rightarrow q & (24) \\
& p \wedge q \equiv \neg(p \rightarrow \neg q) & (25) \\
& \neg(p \rightarrow q) \equiv p \wedge \neg q & (26) \\
& (p \rightarrow q) \wedge (p \rightarrow r) \equiv p \rightarrow (q \wedge r) & (27) \\
& (p \rightarrow r) \wedge (q \rightarrow r) \equiv (p \vee q) \rightarrow r & (28) \\
& (p \rightarrow q) \vee (p \rightarrow r) \equiv p \rightarrow (q \vee r) & (29) \\
& (p \rightarrow r) \vee (q \rightarrow r) \equiv (p \wedge q) \rightarrow r & (30) \\
& p \leftrightarrow q \equiv (p \rightarrow q) \wedge (q \rightarrow p) & (31) \\
& p \leftrightarrow q \equiv \neg p \leftrightarrow \neg q & (32) \\
& p \leftrightarrow q \equiv (p \wedge q) \vee (\neg p \wedge \neg q) & (33) \\
& \neg(p \leftrightarrow q) \equiv p \leftrightarrow \neg q & (34) \\
& \neg \exists x P(x) \equiv \forall x \neg P(x) & (35) \\
& \neg \forall x P(x) \equiv \exists x \neg P(x) & (36) \\
& \frac{p}{p \rightarrow q} & \\
& \frac{p \rightarrow q}{\therefore q} & (37) \\
& \frac{\neg q}{p \rightarrow q} & \\
& \frac{p \rightarrow q}{\therefore \neg p} & (38) \\
& \frac{p \rightarrow q}{q \rightarrow r} & \\
& \frac{q \rightarrow r}{\therefore p \rightarrow r} & (39) \\
& \frac{p \vee q}{\neg p} & \frac{p \vee q}{\neg q} \\
& \frac{\neg p}{\therefore q} & \frac{\neg q}{\therefore p} & (40) \\
& \frac{p}{\therefore p \vee q} & \frac{p}{\therefore q \vee p} & (41) \\
& \frac{p \wedge q}{\therefore p} & \frac{p \wedge q}{\therefore q} & (42) \\
& \frac{p}{q} & \\
& \frac{q}{\therefore p \wedge q} & (43)
\end{aligned}$$

$$\frac{p \rightarrow q}{\therefore \neg q \rightarrow \neg p} \quad (44)$$

$$\frac{p \vee q}{\neg p \vee r} \\
\therefore q \vee r \quad (45)$$

$$a \notin A \equiv \neg(a \in A) \quad (46)$$

$$\{x \mid x \in A\} = A \quad (47)$$

$$P(a) \equiv a \in \{x \mid P(x)\} \quad (48)$$

$$(A = B) \equiv \forall x(x \in A \leftrightarrow x \in B) \quad (49)$$

$$(A \subseteq B) \equiv \forall x(x \in A \rightarrow x \in B) \quad (50)$$

$$(A \subset B) \equiv \forall x(x \in A \rightarrow x \in B) \wedge \exists x(x \in B \wedge x \notin A) \quad (51)$$

$$\emptyset \subseteq S, \text{ para todo } S \quad (52)$$

$$\emptyset = \{x \mid \text{F}\} \quad (53)$$

$$x \in \emptyset \equiv \text{F} \quad (54)$$

$$S \subseteq S, \text{ para todo } S \quad (55)$$

$$(A \times \emptyset) = (\emptyset \times A) = \emptyset \quad (56)$$

$$A \cup B = \{x \mid x \in A \vee x \in B\} \quad (57)$$

$$(x \in A \vee x \in B) \equiv (x \in (A \cup B)) \quad (58)$$

$$A \cap B = \{x \mid (x \in A) \wedge (x \in B)\} \quad (59)$$

$$(x \in A \wedge x \in B) \equiv (x \in (A \cap B)) \quad (60)$$

$$|A \cup B| = |A| + |B| - |A \cap B| \quad (61)$$

$$A - B = \{x \mid x \in A \wedge x \notin B\} \quad (62)$$

$$(x \in A \wedge x \notin B) \equiv (x \in (A - B)) \quad (63)$$

$$\overline{A} = \{x \mid x \notin A\} \quad (64)$$

$$(x \notin A) \equiv (x \in \overline{A}) \quad (65)$$

$$A \cup \emptyset = A \quad (66)$$

$$A \cap U = A \quad (67)$$

$$A \cup U = U \quad (68)$$

$$A \cap \emptyset = \emptyset \quad (69)$$

$$A \cup A = A \quad (70)$$

$$A \cap A = A \quad (71)$$

$$\overline{(\overline{A})} = A \quad (72)$$

$$A \cup B = B \cup A \quad (73)$$

$$A \cap B = B \cap A \quad (74)$$

$$A \cup (B \cup C) = (A \cup B) \cup C \quad (75)$$

$$A \cap (B \cap C) = (A \cap B) \cap C \quad (76)$$

$$A \cap (B \cup C) = (A \cap B) \cup (A \cap C) \quad (77)$$

$$A \cup (B \cap C) = (A \cup B) \cap (A \cup C) \quad (78)$$

$$\overline{A \cup B} = \overline{A} \cap \overline{B} \quad (79)$$

$$\overline{A \cap B} = \overline{A} \cup \overline{B} \quad (80)$$

$$A \cup (A \cap B) = A \quad (81)$$

$$A \cap (A \cup B) = A \quad (82)$$

$$A \cup \overline{A} = U \quad (83)$$

$$A \cap \overline{A} = \emptyset \quad (84)$$