

p	q	$p \rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T

$$(1) \quad (-4) > 2 \quad \Rightarrow \quad (-4)^2 > (2)^2$$

≡

$$(-4) > 2 \quad \Rightarrow \quad 16 > 4$$

|| =

F || T

$$(2) \quad (\sqrt{2}) > \frac{3}{2} \quad \Rightarrow \quad (\sqrt{2})^2 > \left(\frac{3}{2}\right)^2 \quad \Rightarrow \quad 2 > \frac{9}{4}$$

F

F

(1) Operator Precedence

(1) \sim

(2) \wedge

(3) \vee

(4) \rightarrow

De Morgan's Law

(1) $\sim(p \wedge q) \equiv \sim p \vee \sim q$ ✓

(2) $\sim(p \vee q) \equiv \sim p \wedge \sim q$ ✓

$$\Sigma(x \vee y) \equiv \Sigma x \wedge \Sigma y$$

Let

$$\Sigma P \equiv x$$

\implies

$$P \equiv \Sigma x$$

$$\Sigma q \equiv y$$

\implies

$$q \equiv \Sigma y$$

$$\Sigma(\Sigma P \vee \Sigma q) \equiv P \wedge q$$

$$(\Sigma P \vee \Sigma q) \equiv \Sigma(P \wedge q)$$

\neq

$$(1) P \wedge (Q \vee R) \equiv (P \wedge Q) \vee (P \wedge R)$$

$$(2) P \vee (Q \wedge R) \equiv (P \vee Q) \wedge (P \vee R)$$

(3) P (This means P is true)

$P \rightarrow Q$ (" " " $P \rightarrow Q$ is true)

$\therefore Q$ (you can conclude Q is true)

(1) Universal Quantifier

eg: $P(x) \equiv x+1 \geq 0$ (where x is an integer, $x \in \mathbb{Z}$)

$$\textcircled{1} \quad P(1) \equiv 1+1 \geq 0 \quad T$$

$$P(0) \equiv 0+1 \geq 0 \quad T$$

$$P(-5) \equiv F$$

$$(A x \in \mathbb{Z}) [P(x)] \equiv (A x \in \mathbb{Z}) [x+1 \geq 0]$$

②

$$p(x) \equiv x^{2+1} \geq 0$$

$$(\forall x \in \mathbb{Z}) p(x) \equiv (\forall x) [x^{2+1} \geq 0]$$

③ $(\forall x \in \mathbb{Z}) p(x) \equiv (\forall x) [x^{2+1} > 1]$

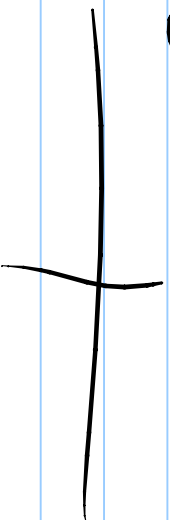
Existenzial Quantifikation \exists

z.B.: $(\exists x \in \mathbb{Z}) [x + 5 = 0]$

Observation

$$\bullet \quad \int_{\mathcal{X}} (Ax) P(x) \equiv (\exists x) \int_{\mathcal{X}} P(x)$$

$$(\bullet) \quad \int_{\mathcal{X}} P(x) \equiv (\exists x) \int_{\mathcal{X}} P(x)$$



Defⁿ: Let n be an integer, n is said to

be even if \exists an integer m such that

$$n = 2m$$

Defn: Let n be an integer, n is said to be odd if \exists an integer m such that $n = 2m + 1$

Proposition: Let n be an even integer then n^2 is even.

[$P(n)$: n is even ; $Q(n)$: n^2 is even]
($\forall n \in \mathbb{Z}$) [$P(n) \rightarrow Q(n)$]

Soln: Let n be any even integer

\Rightarrow \exists an $m \in \mathbb{Z}$ such that $n = 2m$

$$\Rightarrow n^2 = (2m)^2 = 4m^2 = 2 \cdot (2m^2)$$

$\therefore n^2$ is even