

Phase 3 : Quantifiers and Mathematical Notation

Example 1 : Quantifiers

- (a) $\forall x:\mathbb{N} \bullet x \geq 0$
- (b) $\exists y:\mathbb{N} \bullet y = 0$
- (c) $\forall n:\mathbb{N} \bullet n \geq 0 \wedge n < 100$

Example 2 : Subscripts and Superscripts

- (a) x^2
- (b) a_1
- (c) x_i^2

Example 3 : Comparison Operators

- (a) $x < 10$
- (b) $x \geq 0 \wedge x \leq 100$
- (c) $y > 5 \vee y = 0$

Example 4 : Set Operators

- (a) $x \in \mathbb{N}$
- (b) $A \subseteq B$
- (c) $A \cup B \cap C$

Example 5 : Complex Expressions

(a)

$$\begin{aligned} & \forall x:\mathbb{N} \bullet x \in \mathbb{N} \wedge x \geq 0 \\ & \Leftrightarrow \forall x:\mathbb{N} \bullet x \geq 0 \end{aligned}$$

- (b) $\forall i:\mathbb{N} \bullet a_i > 0 \Rightarrow a_i^2 > 0$

(c)

p	q	$\mathbf{p} \Rightarrow \mathbf{q}$
t	t	t
t	f	f
f	t	t
f	f	t