(a) Implement by using laws

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Quantifiers

(i) are word refers to quantities such as sum "all", "some", "may", "few", "each"

domain =) (All values for a numbers that can be consider)

(i) Not exact numbers but range

Types

i- Universal

ii- Existential

Universal:-

(i) Existence of domain

e.g let $p(x) = x+1>x$ for all positive integers.

$x=1$

$=1+1>2$

$\boxed{=2>1}$ True

$x=2$

$=2+1>2$

$\boxed{3>2}$ True

(quantifier symbol) ← $\boxed{\forall x\, p(x) \text{ is True}}$

Quantifier statement

Example 2:

- let $Q(x)$ be the statement $x < 2$ for all positive integers.

$$Q(x) = x < 2$$
$$Q(1) = 1 < 2$$
$$Q(2) = 2 < 2$$

$Q(x)$ is true when $x = 1$

(Quantifiers) $\leftarrow \exists (x)\ Q(x)$

There exists "some" x for which $Q(x)$ is true.

Universal Quantifiers

↳ counter examples

when does $\forall x\ P(x)$ becomes False

let

$$P(x) = x < 4$$
$$P(5) = 5 < 4 \quad \text{False}$$
$$P(4) = 4 < 4 \quad \text{False}$$

→ counter example

?

e.g

$Q(x) : x+1 > 2x$

all integers

what will be the truth value

$\forall x \; Q(x)$

$Q(x) : x+1 > 2x$

$Q(1) : 1+1 > 2(1)$

$: 2 > 2$ False

$Q(2) : 2+1 > 2(2)$

$: 3 > 4$

when 0

$Q(0) : 0+1 > 2(0)$

$: 1 > 0$

$\forall x / x \geq 1$ is False. $Q(x)$

$\forall x / x \leq 0$ is true $Q(x)$

(i) $\forall(x) Q(x)$ is False (for all) $\forall$ positive integers

(ii) $\forall(x) \; Q(x)$ is True $\forall$ negative integers.