Pumping lemma

→ Pumping lemma is generally used for proving a given grammar is not regular.

Ex-1 A language is regular or not regular.

→

Language → F.L, IL

F.L → R.L

$[L \to FA \to R.L]$

$L = \{a^n \mid n \geq 0\}$

P.L → pattern $L = \{a^0, a^1, a^2, \ldots\}$

not find pattern (Not regular)

(find pattern) (R.L - may or may not)

→ P.L is negativity test.

Ex-2

$L = \{a^n \mid n \text{ is even}\}$ $n = 0, 2, 4, \ldots$

→ $L = \{a^0, a^2, a^4, a^6, \ldots\}$ (A.P)

∴ given language are RL (because It has a follow pattern like Arithmetic Progression)

Ex-2 $L = \{a^p \mid p \text{ is prime}\}$ $p = 3, 5, 7, 11, 17, \ldots$

→ $L = \{a^3, a^5, a^7, a^{11}, a^{17} \ldots\}$ (not A.P)

So given language are not R.L (because It has not ~~contain any~~ follow ~~are~~ any pattern or A.P)

Ex-4) $L = \{a^n \mid n \text{ is odd}\}$

→ $n = \{1, 3, 5, \dots\}$ A.P.

given language L is RL.

Ex-5) $L = \{(ab)^n \mid n \geq 0\}$ $n = 0, 1, 2, 3, \dots$

$L = \{\epsilon, ab, abab, ababab \dots\}$

given L is RL.

Ex-6) $L = \{a^n \mid n = 100^{100}\}$

→ L is Regular language (RL), because it is finite set of string.