

# Assignment 1: Problem 1

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## 1 Notation

Zero or first unary natural number: 0 Successor of n:  $s(n)$  Multiple successor operations:  $sss(n)$ , equals to the successor of the successor of the successor of n.

## 2 Solution

**Base Case:**

$$(1+x)^n \geq nx$$

**Step Case:**

$$(1+x)^{n+1} \geq (n+1)x$$

$$(1+x)^n(1+x) \geq x(n+1)$$

$$(1+x)^n + x(1+x)^n \geq xn + x$$

$$(1+x)^n \geq nx, \text{ Then we have:}$$

$$x(1+x)^n \geq x$$

$$(1+x)^n \geq 1$$