

# Hoja de trabajo # 3

## Ejercicio #1

$$1) \forall n \geq 1$$

$$2 \times \text{nespar}$$

**Caso base**

$$n = 1$$

$$2(1) \text{ es par}$$

$$2 \text{ es par}$$

**Caso inductivo**

$$2 * n \text{ es par}$$

$$n = n + 1$$

$$2(n + 1) \text{ es par}$$

$$2n + 2 \text{ es par}$$

$$2 \text{ es par}$$

$$2) \forall \geq 4$$

$$2^n < n!$$

$$n! = 1 \cdot 2 \cdot 3 \cdot \dots \cdot (n-1) \cdot n$$

**Caso Base**

$$n = 4$$

$$2^4 < 1 \times 2 \times 3$$

$$16 < 2^4$$

**Caso inductivo**

$$n = n + 1$$

$$\forall n \geq 4, 2^n < n!$$

$$2^n * 2 < n!(n + 1)$$

$$2[2^n < n!(n + 1)]$$

## Ejercicio #2

$$1) n! = 1 \otimes 2 \otimes 3 \otimes \dots \otimes (n + 1) \otimes n$$

$$n! \begin{cases} 1, 5 : n = 0 \\ (x!) \otimes (\sigma(x)) \end{cases}$$

$$2) a \ominus b = \begin{cases} a / b = 0 \\ 0 / a \wedge b = 0 \\ \sigma(x \ominus b) / a = \sigma(x) \end{cases}$$

$$4) a^b = b \otimes a \otimes a \dots (b \text{ veces})$$

$$a^b \begin{cases} 1'' si'' b = 0 \\ 0'' si'' a = 0 \\ a \otimes a'' si'' b = \sigma(i) \end{cases}$$

## Ejercicio #3

$$a \otimes b = \begin{cases} 0 / a \vee b = 0 \\ a / b = 1 \\ B / a = 1 \\ a \oplus (a \otimes x) / \sigma(x) \end{cases}$$

$$2 \otimes a = a \oplus a$$

**Caso base**

$$2 \otimes 0 = 0 \oplus 0$$

$$0 \oplus (0 \otimes 1) = 0 \oplus 0$$

$$0 \oplus 0 = 0 \oplus 0$$

$$0 = 0$$

**Caso inductivo**

$$2 \otimes \sigma(a) = \sigma(a) \oplus \sigma(a)$$

$$\sigma(a) \oplus (\sigma(a) \otimes 1) = \sigma(a) \oplus \sigma(a)$$

$$\sigma(a) \oplus (\sigma(a)) = \sigma(a) \oplus \sigma(a)$$

$$\sigma(a) \oplus \sigma(a) = \sigma(a) \oplus \sigma(a)$$

$$\sigma(\sigma(a \oplus a)) = \sigma(\sigma(a \oplus a))$$

$$(a \oplus a) = (a \oplus a)$$

$$(a \oplus a) = (2 \otimes a)$$