Ejercicio #1 (50 %)

Demostrar utilizando inducción:

$$\forall\ n.\ n^3 \geq n^2$$

donde $n \in \mathbb{N}$

Caso base

n$^3 \geq n^2$

n = 0

(0)*(0)*(0) = (0)*(0)

Caso inductivo

n$^3 \geq n^2$

(n+1)$^3 \geq (n+1)^2$

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

(n+1) * (n*n+2n+1*1) $\geq (n*n+2n+1*1)$

u = (n*n+2n+1*1)

(n+1) * u $\geq u$

n*u + u*1 $\geq u$

(n+1) ≥ 1

n ≥ 0

Ejercicio #2 (50 %)

Demostrar utilizando inducción la desigualdad de Bernoulli:

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

donde $n \in \mathbb{N}$, $x \in \mathbb{Q}$ y $x \geq -1$

Caso base

(x+1)$^n >= n*x+1$

n= 0

(x+1)$^n >= n*x+1$

(x+1)$^($0$) >= (0)*x$

0*x + 0*1 = 0*x

0 = 0

Caso inductivo

(x+1)$^($$n+1) >= (n+1)x+1$

(x+1)$^n + 1 >= (n+1)*x+1$

(x+1)$^n * (x+1) >= (n+1)x+1$

(x+1)$^n * (x+1) >= nx+x+1$

(x+1)$^n + 1 >= x(n+1)+1$

(n+1) = u

(x+1)$^u >= xu+1$