

$$(1+x)^n \geq 1+nx, \quad n \in \mathbb{N}, \quad x \geq -1$$

$$k=1$$

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

Holds for k

$$(1+x)^k \geq 1+kx$$

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

$$(1+x)^{k+1} = (1+x)^k (1+x) \geq (1+kx)(1+x) = 1+x+kx+kx^2 > 1+x+kx = 1+x(k+1)$$