Problem 10.2

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$(\text{x} < 0 \wedge \text{x} \geq \text{-1}) \Rightarrow (1+x)^n \geq nx$

Proof:
Left hand side will be positive while the right hand side will be negative.

For $x \geq 0$
$P(n) \Rightarrow (1+x)^n \geq nx$

Proof:

B. Case:

$1 \geq 0 \equiv True$

Ind. Step:

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

By P(n), $(1+x)^n \geq nx$

$x \geq 0$
$(1+x)^n \geq 1$
$x(1+x)^n \geq x$

$\therefore P(n+1) \equiv True$

□