Assignment 0

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1 Problem 1

Theorem: if n is odd than n^2 is odd

Direct proof:

if n is odd, then $n = 2k + 1$

if n^2 is odd, then $n^2 = 2k + 1$

$(2k + 1)^2 = 2k$

$(2k + 1)(2k + 1) = 2k + 1$

$4k^2 + 2k + 2k + 1 = 2k + 1$

$2(2k^2 + k + k) + 1$

$2k + 1 = 2k + 1$

2 Problem 2

Theorem: If $a, b > 225$ and $a, b \in N^+$, then either $a > 15$ or $b > 15$

Proof by contraposition: $(a \leq 15)$ and $(b \leq 15)$ then $(ab \leq 225)$

if $a = 15$ and $b = 15$

then $ab \geq 225$