
Claim 1:

$$n^2 = 1 + 3 + 5 + \dots + (2n - 1),$$

for any positive integer n .

Claim 2:

$$4n^2 + 4n$$

is a multiple of 8 for any integer $n \geq 0$.

Claim 3:

$$a_n = 5 \cdot 2^{n-1} - 3 \text{ for all integers } n \geq 1,$$

if $a_1 = 2$, and $a_n = 2a_{n-1} + 3$ for integers $n \geq 2$

Claim 4:

$$2n + 1 < 2^n,$$

for any positive integer $n \geq 3$

Claim 5:

$$n! \leq n^n,$$

for any positive integer n .