Inductive Proof

$a(0) = 1$, $d = 2$

$a(1) = 1 + 2 = 3 = a(0) + 2$

$a(2) = 3 + 2 = 5 = a(1) + 2 = ((a(0) + 2) + 2) + 2$

$a(n) = a(0) + 2n$

Prove:

$a(n) = a(n-1) + 2 = a(0) + 2n$

Base Case (usually the recursive

$a(0) = a(0) + 2(0)$

$a(0) = a(0)$

Hypothesis:

$a(k) = a(k-1) + 2 = a(0) + 2k$ is TRUE

$a(0) = 1$

for $k \geq 0$

Proof:

$a(k+1) = a(k+1-1) + 2 = a(0) + 2(k+1)$

$a(k+1) = a(k) + 2 = a(0) + 2k + 2$

$a(0) + 2k + 2 = a(0) + 2k + 2$

Second Proof

Prove:

$a(n) = a(n-1) \cdot r = a(0) \cdot r^n$

Base Case:

$n = 0$

$a(0) = a(0) \cdot r^0$

Hypothesis:

$a(k) = a(k-1) \cdot r = a(0) \cdot r^k$ is TRUE

for k ≥ 0

Proof:

$a(k+1) = a(k+1-1) \cdot r = a(0) \cdot r^{k+1}$

$a(k+1) = a(k) \cdot r = a(0) \cdot r^{k+1}$

$a(k+1) = a(0) \cdot r^k \cdot r = a(0) \cdot r^{k+1}$

$a(k+1) = a(0) \cdot r^{k+1} = a(0) \cdot r^{k+1}$