Proof: By Case

Since n is a integer, it must be odd number, even number or 0.

if n is odd, then n^2 and n is also odd.So the sum of three numbers $n^2 + n + 1$ is odd.

if n is even, then n^2 and n is even.So the sum of two even numbers plus one $n^2 + n + 1$ is odd.

if n is 0, then $n^2 + n + 1 = 1$ is odd.

the following conclusion is true.