

October 23rd

One more than the product of four consecutive integers is always a square number.

Show $n(n + 1)(n + 2)(n + 3) + 1$ is always a square number.

$$n(n + 1)(n + 2)(n + 3) + 1 =$$

$$(n^2 + n)(n^2 + 5n + 6) + 1 =$$

$$n^4 + 6n^3 + 11n^2 + 6n + 1 =$$

$$(n^2 + 3n + 1)(n^2 + 3n + 1)$$

$$=(n^2 + 3n + 1)^2$$