

## Answer on Question #76363 – Math – Discrete Mathematics

### Question

Prove that  $3n^2 - n + 10$  is an even integer for all integers  $n$ . (Hint: Prove the statement true when  $n$  is odd, then prove it is true when  $n$  is even.)

### Solution

Let's consider two cases. Since the sum of two odd numbers is even and the sum of two even numbers is again even, the product of two even numbers is even, the product of two odd numbers is odd.

Case 1)  $n$  is even. Then  $3n^2$  is even, so  $3n^2 - n + 10$  is even.

Case 2)  $n$  is odd. Then  $3n^2$  is odd, so  $3n^2 - n + 10$  is even.

Hence  $3n^2 - n + 10$  is even for every natural  $n$ , QED.