sum of odd numbers

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The sum of the first n positive odd integers can be calculated by using the well-known of the arithmetic progression, that the sum of its is equal to the arithmetic mean of the first and the last , multiplied by the number of the :

$$\underbrace{1 + 3 + 5 + 7 + 9 + \cdots + (2n-1)}_{n} = n \cdot \frac{1+(2n-1)}{2} = n^2$$

Thus, the sum of the first n odd numbers is n^2 (this result has been proved first time in 1575 by Francesco Maurolico).

Below, the odd numbers have been set to form a triangle, each nth row containing the next n consecutive odd numbers. The arithmetic mean on the row is n^2 and the sum of its numbers is $n \cdot n^2 = n^3$.

```
                        1
                   3         5
               7        9        11
           13       15       17       19
        21       23       25       27       29
    31       33       35       37       39       41
        ⋮              ⋮                ⋮
```