Prove that the difference between the square of any two consecutive odd integers is divisible by 8

An integer is odd if it can be expressed in the form $2n + 1$

Let the first odd integer $= 2n + 1$

Square the first odd integer $= (2n + 1)^2$

Expand and simplify $= 4n^2 + 4n + 1$

The next consecutive odd integer $= 2n + 3$

Square the first odd integer $= (2n + 3)^2$

Expand and simplify $= 4n^2 + 12n + 9$

Find the difference between the square numbers $= (4n^2 + 12n + 9) - (4n^2 + 4n + 1)$

$= 8n + 8$

$= 8(n + 1)$

…which is divisible by 8