Introduction to Advanced Mathematics, 2nd Assignment

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Theorem. *If x is an odd integer, then x^2 is an odd integer.*

Proof. We assume that x is an odd integer. Then, by definition, there exists an integer k such that

$$x = 2k + 1.$$

$$\begin{aligned} x^2 &= (2k+1)^2 \\ &= 2(2n^2 + 2n) + 1 \end{aligned}$$

Since n is an integer, $2n^2 + 2n$ is an integer. Thus, $2(2n^2 + 2n) + 1$ is an odd number. Therefore, if X is odd, then X-squared is odd

QED