

1 Question:

Prove that the product of any two odd integers is always odd.

2 Answer:

An integer is odd if it has remainder 1 when divided by 2. That is,

$$a \equiv 1 \pmod{2}, \quad b \equiv 1 \pmod{2}. \quad (1)$$

Multiplying both congruences:

$$a \cdot b \equiv 1 \times 1 \equiv 1 \pmod{2}. \quad (2)$$

Since $a \cdot b \equiv 1 \pmod{2}$, it follows that $a \cdot b$ is odd.