every ring is an integer algebra

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Let R be a ring. Then R is also an algebra over the ring of integers if we define the action of $\mathbb{Z}$ on R by the following rules:

$$0 \cdot x = 0$$

$$(n + 1) \cdot x = n \cdot x + x$$

$$(-n) \cdot x = -(n \cdot x)$$

In other words, the action of a positive integer n on x is to add x to itself n times and the action of a negative integer n on x is to subtract x to itself n times.