BEFORE YOU READ

Properties in matched pairs

The properties of arithmetic come in matched pairs for addition and multiplication, with the distributive property bridging the two.

- **L0 Properties of operations**
  - **L1 Addition**
    - L2 Commutative — $a + b = b + a$
    - L2 Associative — $(a + b) + c = a + (b + c)$
    - L2 Identity — 0
    - L2 Inverse — $-a$
  - **L1 Multiplication**
    - L2 Commutative — $a \cdot b = b \cdot a$
    - L2 Associative — $(ab)c = a(bc)$
    - L2 Identity — 1
    - L2 Inverse requires $a \neq 0$ — $1/a$
    - L2 Zero property no additive analog — $a \cdot 0 = 0$
  - **L1 Bridge**
    - L2 Distributive — $a(b + c) = ab + ac$

TAKEAWAY

One property breaks the symmetry

The zero property, $a \cdot 0 = 0$, has no counterpart for addition.