# **Properties of Multiplication**

### **Understanding the Concept**

- Multiplication has special rules called properties
- These properties help us solve problems easily and understand patterns
- We use these rules to make multiplication faster and smarter

## **Important Properties of Multiplication**

- **1. Zero Property**
- Any number multiplied by 0 is always 0

**Example:** 5 × 0 = 0

- 2. Identity Property (Multiplying by 1)
- Any number multiplied by 1 stays the same

**Example:** 8 × 1 = 8

- 3. Commutative Property
- Changing the order of numbers does not change the answer

**Example:** 4 × 7 = 28 and 7 × 4 = 28

- 4. Associative Property
- When multiplying three numbers, the grouping doesn't affect the answer

**Example:**  $(2 \times 3) \times 4 = 6 \times 4 = 24$ 

 $2 \times (3 \times 4) = 2 \times 12 = 24$ 

- 5. Distributive Property (Easy level intro)
- Multiply a number by breaking the other number into parts

**Example:**  $6 \times (2 + 3) = (6 \times 2) + (6 \times 3) = 12 + 18 = 30$ 

## **Examples with Solutions**

#### Example 1:

- $\succ$  What is 9  $\times$  0?
- ✓ Using Zero Property  $\rightarrow$  9 × 0 = 0

Example 2:

- > What is 1 × 13?
- ✓ Using Identity Property  $\rightarrow$  1 × 13 = 13

#### Example 3:

- Show Commutative Property for 6 × 5
- ✓  $6 \times 5 = 30$  and  $5 \times 6 = 30$  → Same answer

#### Example 4:

- > Use Associative Property for  $(2 \times 4) \times 5$
- $\checkmark (2 \times 4) \times 5 = 8 \times 5 = 40$
- $\checkmark 2 \times (4 \times 5) = 2 \times 20 = 40$

#### Example 5:

- $\blacktriangleright$  Use Distributive Property to solve 5 × (4 + 2)
- ✓ 5 × 4 = 20, 5 × 2 = 10, 20 + 10 = 30

### **Summary Points**

Multiplication has special properties that make solving problems easier

- **Zero Property:** Any number × 0 = 0
- Identity Property: Any number × 1 = same number
- Commutative Property: Order doesn't matter
- Associative Property: Grouping doesn't matter
- Distributive Property: Break and multiply, then add the parts