



Properties of operations

Add and multiply — the two that behave

Commutative Order does not matter.

$$3 + 4 = 4 + 3; 3 \times 4 = 4 \times 3$$

Associative Grouping does not matter.

$$(2 + 3) + 7 = 2 + (3 + 7)$$

Identity Leaves the number alone.

$$n + 0 = n; n \times 1 = n$$

Inverse Undoes the operation.

$$n + (-n) = 0; n \times 1/n = 1$$

Add $17 + 8 + 3$ in your head — why the names matter

1 Commutative — reorder

$$17 + 3 + 8$$

2 Associative — regroup

$$(17 + 3) + 8$$

3 Now it is easy

$$20 + 8 = 28$$

Multiply $4 \times 17 \times 25$ — the same two names

1 Commutative — reorder

$$4 \times 25 \times 17$$

2 Associative — regroup

$$(4 \times 25) \times 17$$

3 Now it is easy

$$100 \times 17 = 1700$$

Not this — this

Subtraction is not commutative.

$$7 - 3 = 4 \text{ but } 3 - 7 = -4$$

Division is not either.

$$12 \div 4 = 3 \text{ but } 4 \div 12 = \frac{1}{3}$$

$(2 - 5) - 1$ is not $2 - (5 - 1)$.

$$-4, \text{ not } -2$$