Basic Number Properties of Addition

Commutative property of addition: When two numbers are added, the sum is the same regardless of the order of addition. For example: 5 + 4 = 4 + 5

Associative property of addition: When three or more numbers are added, the sum is the same regardless of the order of addition. For example: (3 + 4) + 6 = 3 + (4 + 6)

Example 1

What property is expressed in the following equation?

39 + 66 = 66 + 39

Explanation

We are interchanging two numbers, therefore commutative property is shown.

Example 2

What property is expressed in the following equation?

146 + 138 + 54 = 138 + (146 + 54)

Explanation

First 146 + 138 + 54 = 138 + 146 + 54, we are interchanging two numbers, therefore commutative property is applied.

Second 138 + 146 + 54 = 138 + (146 + 54), to simplify the calculation, we are re-grouping the numbers of the problem; therefore it is the associative property being applied.

Example 3

Fill in the missing number according to the associative property of addition.

213 + 39 + 61 = 213 + (___ + ___)

Explanation

213 + 39 + 61 = 213 + (39 + 61)

We are regrouping the numbers in the problem and the sum is same regardless. Therefore associative property is applied.

Example 4

Use the number properties to simplify the calculation: 147 + 316 + 353

Explanation

Adding 147 and 353 would yield a number that is multiple of 100. Therefore we apply the associative property to group them together.

147 + 316 + 353

= 147 + 353 + 316

= 500 + 316

= 816

Example 5

Use the number properties to solve: 48 + 158 + 42 + 152

Explanation

When we look at the patterns of the 4 numbers, they add up to equal 200 if we regroup them.

48 + 158 + 42 + 152

200

200

If we can regroup numbers resulting multiple of 10, 100, etc, that would simplify the calculation.

48 + 158 + 42 + 152

= 48 + 152 + 42+ 158 — Commutative property is applied.

= (48 + 152) + (42 + 158) — Associative property is applied.

= 200 + 200

= 400

Strategies involved with subtraction:

Regrouping subtrahends, the difference remains the same: $a - b - c = a - c - b$

Subtracting two numbers is equal to subtracting the sum of two: $a - b - c = a - (c + b)$

Example 6

Solve: 456 – 249 – 156

Explanation

456 – 249 – 156

= 456 – 156 – 249

= 300 – 249

= 51

Example 7

Solve: 397 – 154 – 46

Explanation

397 – 154 – 46

= 397 – (154 + 46)

= 397 – 200

= 197