Commutative Property

The Commutative Property is similar to the Associative Property, but the Commutative Property tells us specifically that we can add or multiply numbers in any order. For example, $2 + 5 = 5 + 2$.

Commutative Property

Like the Associative Property, the **Commutative Property** applies to both addition and to multiplication.

Commutative Property of Addition	$a + b = b + a$
Commutative Property of Multiplication	$a \cdot b = b \cdot a$

"Commutative" comes from the word "commute," and since commute means to move, we can remember that when we use the commutative property, the numbers will move around.

Let's do an example where we use the Commutative Property to rewrite the expression.

Example

Use the Commutative Property to write the expression a different way, without performing the multiplication.

$$5 \cdot 3 \cdot 2$$

We know that when we apply the Commutative Property of Multiplication, the numbers change places. So we could use the Commutative Property to rewrite $5 \cdot 3 \cdot 2$ as any of these:

$$5 \cdot 2 \cdot 3$$

$$3 \cdot 5 \cdot 2 \qquad 3 \cdot 2 \cdot 5$$

$$2 \cdot 5 \cdot 3 \qquad 2 \cdot 3 \cdot 5$$

What we see is that, regardless of the order in which we perform the multiplication, we always get the same value.

$$5 \cdot 3 \cdot 2 = 15 \cdot 2 = 30 \qquad 5 \cdot 2 \cdot 3 = 10 \cdot 3 = 30$$

$$3 \cdot 5 \cdot 2 = 15 \cdot 2 = 30 \qquad 3 \cdot 2 \cdot 5 = 6 \cdot 5 = 30$$

$$2 \cdot 5 \cdot 3 = 10 \cdot 3 = 30 \qquad 2 \cdot 3 \cdot 5 = 6 \cdot 5 = 30$$

Let’s try another example, this time with the Commutative Property of Addition.

Example

Are the expressions $4 + 12 + 7$ and $7 + 4 + 12$ equivalent?

The equation is true by the Commutative Property of Addition, which tells us that we can change the order of the terms, and the sum of the terms will still be the same.

Since we've just moved the 7 from its position as the last term to become the first term, we've only changed the order of the addition, and that won't change the value of the sum.

If we simplify both expressions, we get the same value.

$$4 + 12 + 7 = 16 + 7 = 23$$

$$7 + 4 + 12 = 11 + 12 = 23$$