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The Commutative Property: Definition and Examples

There are three major properties that deal with the addition and multiplication of numbers. One of those properties is the commutative property. This lesson will define and give examples of the commutative property and how it works.

The Long Commute

If you commute to school or work, you know that sometimes the traffic can drive you crazy. Maybe, like me, you have four of so different routes you can take to work that all are about the same distance and take roughly the same amount of time (depending on if you catch the lights right or not).

Obviously, you have decided on each of these routes to your destination because each of them will get you where you want to go. There probably is no chance that you will drive in a pattern that will not get you to school (even if you would like to take the day off). That is the whole point of the commute - to get you there, regardless of the pattern you take to get you there.

A Mathematical Commute

Right now you might be sitting there thinking, what on earth does this have to do with math? Keep listening, and you will find out.

In mathematics, there are three basic principles for how equations work. They form the backbone of all higher math. These properties are:

• The commutative property

• The associative property

• The distributive property

The Commutative Property

This lesson focuses on the **commutative property**. It states that you can swap terms in an equation and still get the same answer. Just like your commute where you can take different routes to get to the same place, in addition and multiplication, you can swap the order of your terms and still get the same answer.

Let's look at a simple example: 2 + 5 = 7.

When you swap the terms, in this case the 2 and 5, you will still get the same answer: 5 + 2 = 7.

It works for multiplication as well. 4 * 6 = 24 is the same as 6 * 4 = 24.

As my high school algebra teacher said: the commutative property means that 'order doesn't matter' (for addition and multiplication).

It also doesn't matter how long your problem is. 5 + 3 + 9 + 12 is the same as 12 + 3 + 5 + 9. The answer is 29 both times.

Or 2 * 7 * 5 * 1 is the same as 7 * 2 * 1 * 5. Again, the answer will be 70, no matter what order the numbers are in.

The commutative property can also work with subtraction, if you are very careful. If you remember, subtraction is the opposite of addition. Because of this, you can turn any subtraction problem into an addition problem. This means that 6 - 3 is the same as 6 + (-3).

When you turn your subtraction problem into an addition problem, you can apply the commutative property. 7 - 4 can be changed to 7 + (-4) and then swapped to equal (-4) + 7. No matter which way you arrange it, the answer is 3.

So What?

With simple problems such as these, you might be scratching your head, wondering why mathematicians go to all this trouble. The reason they do so is for the complicated problems. When mathematicians or scientists or engineers are working with a complex equation, it can help them with the solution if they are sure that they can arrange the terms without affecting the problem.

Lesson Summary

The commutative property states that in addition and multiplication problems, the order of the terms does not matter to the final outcome of the problem. You can arrange the terms in any order and still obtain the correct answer. The property is also true for subtraction if you convert your subtraction problem to an addition problem and are very careful to keep the negative with the correct number.

Learning Outcomes

After you have finished with this lesson, you should be able to:

- Utilize the commutative property when solving addition and multiplication problems
- Apply the commutative property to subtraction problems