

Arithmetic Operators

In this lesson, we will dive into some arithmetic operators in JavaScript.

WE'LL COVER THE FOLLOWING



- The uniqueness of the **+** operator
- More rules on arithmetic operators

JavaScript supports the following binary arithmetic operators: add (**+**), subtract (**-**), multiply (*****), divide (**/**), and modulus (**%**).

With numeric values, all operators work just as you expect them.

Except for the add operator, all others work with non-numeric values by casting the operands to a Number value.



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The uniqueness of the **+** operator

The add operator is a bit different:

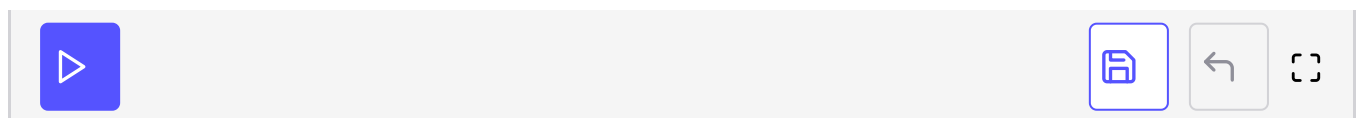
If one of the operands is a string, the result of the operation is a string.

according to these rules:

- If **both operands are strings**, the second string is concatenated to the first
- If only **one operand is a string**, the other operand is converted to a string and the result is the concatenation of the two strings

This behavior of add is a source of common mistakes, as this code snippet shows:

```
var num1 = 12;  
var num2 = 23;  
console.log("12 + 23 = " + num1 + num2); // 12 + 23 = 1223  
console.log("12 + 23 = " + (num1 + num2)); // 12 + 23 = 35
```



The expression in the first `console.log()` method converts `num1` to a string, because the left operand of add is another string. The result is a string, so `num2` is converted to a string, too.

In the second expression, the parentheses change the operator precedence, and so first the `num1 + num2` expression is evaluated to 35, then this value is converted to a string.

Arithmetic operators can handle special values, such as ``NaN``, ``Infinity`` and ``-Infinity``

- If any of the operands is `NaN`, the operation result will be `NaN`, too.
- If an operation provides a result that is higher than the maximum value that can be represented by `Number`, the result is `Infinity`.
- Similarly, if the result is lower than lowest negative value that can be represented by `Number`, the result is `-Infinity`.

More rules on arithmetic operators

There are a number of other rules:

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1. Infinity added to $-\text{Infinity}$ results NaN.
2. Infinity subtracted from Infinity results NaN.
3. Infinity multiplied by 0 results NaN.
4. Infinity multiplied by Infinity results Infinity.
5. If Infinity is multiplied by any finite number other than 0, the result is either Infinity or $-\text{Infinity}$, depending on the sign of the second operand.
6. Infinity divided by Infinity results NaN.
7. Zero divided by zero results NaN.
8. If a nonzero finite number is divided by zero, the result is either Infinity or $-\text{Infinity}$, depending on the sign of the first operand.
9. If Infinity is divided by any number, the result is either Infinity or $-\text{Infinity}$, depending on the sign of the second operand.
10. If the dividend is an infinite number and the divisor is a finite number, modulus results NaN.
11. If the dividend is zero and the divisor is nonzero, modulus results zero.

These rules are not easy to remember by heart. If you are uncertain, just try to apply them, and see the results.

In the *next lesson*, we'll have a look at the equality operators.