#### Operators

An operator is a symbol that specifies the type of operation to perform on one or more operands. There are arithmetic, comparison, text, and [reference](reference.docx) operators.

infix-operator:  
: | , | space | ^ | \* | / | + | - | & | = | <> | < | <= | > | >=

postfix-operator:  
%

prefix-operator:  
-

The operators permitted in expression are:

|  |  |  |  |
| --- | --- | --- | --- |
| Operators | | | |
| Family | Operator | Description | Precedence |
| Reference operators | : | Binary range operator, which takes two [cell](cell.docx) [reference](reference.docx) (§) operands, and results in one [reference](reference.docx) to the cells inclusive of, and between, those references. [Example: SUM(B5:C15), which [references](references.docx) 11 cells. end example] | highest |
| , | Binary union operator, which takes two [cell](cell.docx) [reference](reference.docx) (§) operands, and results in one [reference](reference.docx) to all those, possibly non-contiguous, cells. [Example: SUM((B5:B15,D5:D15))), which [references](references.docx) 22 cells, 11 from column B, and 11 from column D. The grouping parentheses are necessary to indicate that the comma is an operator rather than a punctuator separating two arguments. end example] |
| space | Binary intersection operator, which takes two [cell](cell.docx) [reference](reference.docx) (§) operands, and results in one [reference](reference.docx) to those, possibly non-contiguous, cells that are common. If the intersection is empty, the result is #NULL!. [Example: COUNT((B1:C1) (C1:D1)), which results in a [reference](reference.docx) to C1, while COUNT((B1:D1) (B1,D1)) results in a single [reference](reference.docx) to B1 and D1.  end example] |
| Arithmetic operators | - | Unary minus |  |
| % | Percentage (unary postfix), which divides its operand by 100. [Example: 10.5%, which results in 0.105. end example] |  |
| ^ | Exponentiation |  |
| \* | Multiplication |  |
| / | Division |
| + | Addition |  |
| - | Subtraction |
| Text operator | & | Text concatenation (Each of the two operands is converted to text, if necessary, before concatenation.) |  |
| Comparison operators | = | Equal-to | lowest |
| <> | Not-equal-to |
| < | Less-than |
| <= | Less-than or equal-to |
| > | Greater-than |
| >= | Greater-than-or-equal-to |

expression can contain grouping parentheses to document the default precedence or to override it.

operators in expression having the same precedence associate left-to-right.

[Example: Given that cell E38 contains the value 4, and cell F38 contains the value 2, the [formula](formula.docx)

((-1+E38^2)\*3-F38)/2

produces the result 21.5. end example]

The comparison operators yield [TRUE](TRUE.docx) for true and [FALSE](FALSE.docx) for false. An expression with value 0 tests logically false while one with any non-zero value tests true.

For any given operator in an expression, if only one operand is an error value, the result is that error value. If more than one operand has an error value and those error values are the same, the result is that error value. If more than one operand has an error value and those error values are not all the same, as to which of those error values is used as the result is unspecified.

It the semantics of an operator having a given operand are not specified by this Standard, the result is #VALUE!. [Example: "abc"+1 results in #VALUE!, and "abc"/0 results in #VALUE! rather than #DIV/0!. end example]