

# Operators

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Operators are used on variables and values

## Several types are possible

Arithmetic operators

Assignment operators

Comparison operators

Logical operators

Identity operators

Membership operators

Bitwise operators

## Python Arithmetic Operators

Arithmetic operators are used with numeric values to perform common mathematical operations:

Operator	Name	Example
+	Addition	$x + y$
-	Subtraction	$x - y$
*	Multiplication	$x * y$
/	Division	$x / y$
%	Modulus	$x \% y$
**	Exponentiation	$x ** y$
//	Floor division	$x // y$

## Python Assignment Operators

Assignment operators are used to assign values to variables:

Operator	Example	Same As
=	$x = 5$	$x = 5$
+=	$x += 3$	$x = x + 3$
-=	$x -= 3$	$x = x - 3$
*=	$x *= 3$	$x = x * 3$
/=	$x /= 3$	$x = x / 3$
%=	$x \% = 3$	$x = x \% 3$
//=	$x //= 3$	$x = x // 3$

<b>**=</b>	x **= 3	x = x ** 3
<b>&amp;=</b>	x &= 3	x = x & 3
<b> =</b>	x  = 3	x = x   3
<b>^=</b>	x ^= 3	x = x ^ 3
<b>&gt;&gt;=</b>	x >>= 3	x = x >> 3
<b>&lt;&lt;=</b>	x <<= 3	x = x << 3

\*Note: some operators will modify variable types!

## Python Comparison Operators

Comparison operators are used to compare two values:

Operator	Name	Example
<b>==</b>	Equal	x == y
<b>!=</b>	Not equal	x != y
<b>&gt;</b>	Greater than	x > y
<b>&lt;</b>	Less than	x < y
<b>&gt;=</b>	Greater than or equal to	x >= y
<b>&lt;=</b>	Less than or equal to	x <= y

## Python Logical Operators

Logical operators are used to combine conditional statements:

Operator	Description	Example
<b>and</b>	Returns True if both statements are true	x < 5 and x < 10
<b>or</b>	Returns True if one of the statements is true	x < 5 or x < 4
<b>not</b>	Reverse the result, returns False if the result is true	not(x < 5 and x < 10)

## Python Identity Operators

Identity operators are used to compare the objects, not if they are equal, but if they are actually the same object, with the same memory location:

Operator	Description	Example
<b>is</b>	Returns True if both variables are the same object	x is y
<b>is not</b>	Returns True if both variables are not the same object	x is not y

## Python Membership Operators

Membership operators are used to test if a sequence is presented in an object:

Operator	Description	Example
in	Returns True if a sequence with the specified value is present in the object	x in y
not in	Returns True if a sequence with the specified value is not present in the object	x not in y

## Python Bitwise Operators

Bitwise operators are used to compare (binary) numbers:

Operator	Name	Description
&	AND	Sets each bit to 1 if both bits are 1
	OR	Sets each bit to 1 if one of two bits is 1
^	XOR	Sets each bit to 1 if only one of two bits is 1
~	NOT	Inverts all the bits
<<	Zero fill left shift	Shift left by pushing zeros in from the right and let the leftmost bits fall off
>>	Signed right shift	