

Logical Expressions

Used to Control Program Flow:

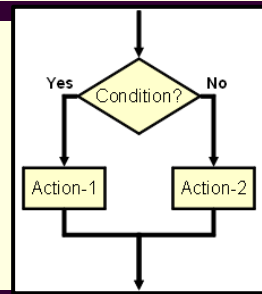
`if`, `else if` and `else`

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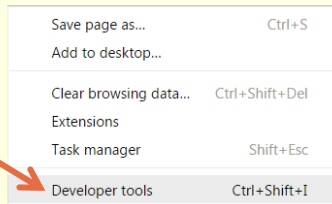
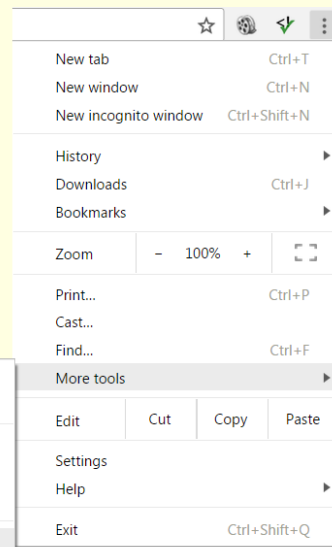
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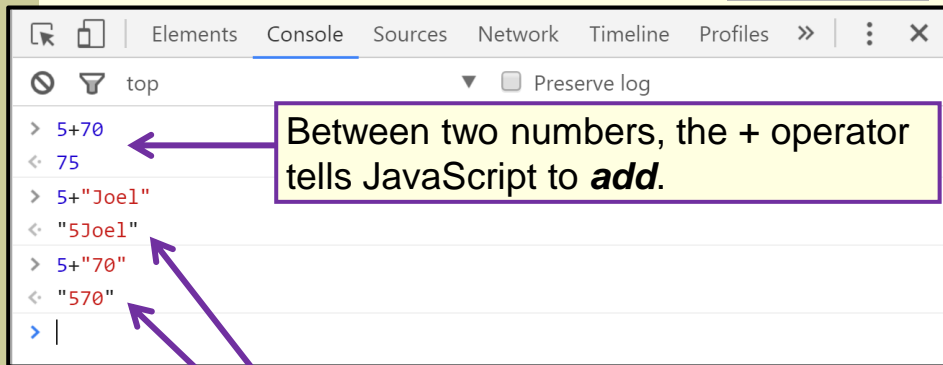


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JavaScript Console



JavaScript Console: + Operator



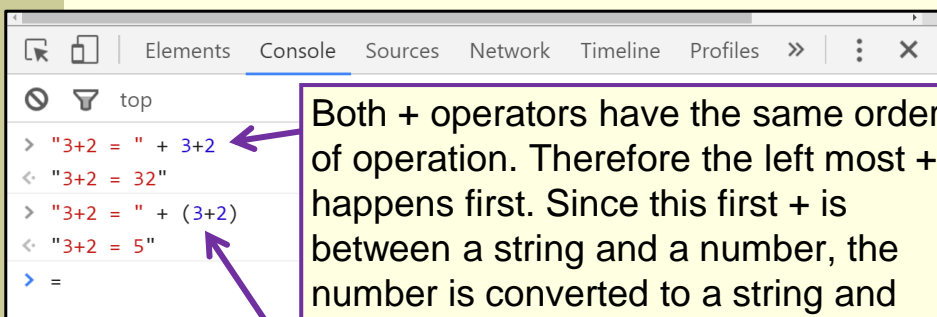
```
> 5+70  
< 75  
> 5+"Joel"  
< "5Joel"  
> 5+"70"  
< "570"  
> |
```

Between two numbers, the + operator tells JavaScript to **add**.

Between a number and a string or between two strings, the + operator tells JavaScript to **concatenate**.

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JavaScript Console: + Operator



```
> "3+2 = " + 3+2  
< "3+2 = 32"  
> "3+2 = " + (3+2)  
< "3+2 = 5"  
> =
```

Both + operators have the same order of operation. Therefore the left most + happens first. Since this first + is between a string and a number, the number is converted to a string and the + is concatenation.

The () changes the order of operations.

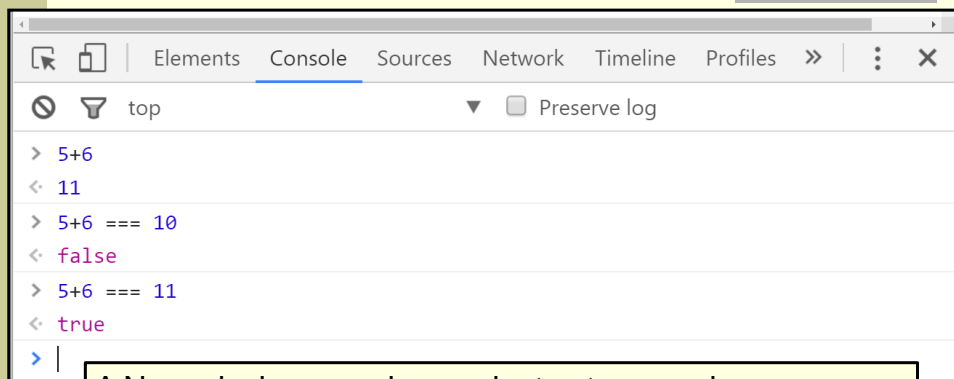
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JavaScript Modulus operator: %

| | | |
|--------------|-------------|--------------|
| 5 % 2 1 | 2 % 5 2 | 22 % 5 2 |
| 6 % 2 0 | 20 % 5 0 | 99 % 3 0 |
| 6 % 0 NaN | 21 % 5 1 | 101 % 3 2 |

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Numerical verses Logical Expressions



```
< Elements Console Sources Network Timeline Profiles >> | : X
top [v] [x] Preserve log
> 5+6
< 11
> 5+6 === 10
< false
> 5+6 === 11
< true
> |
```

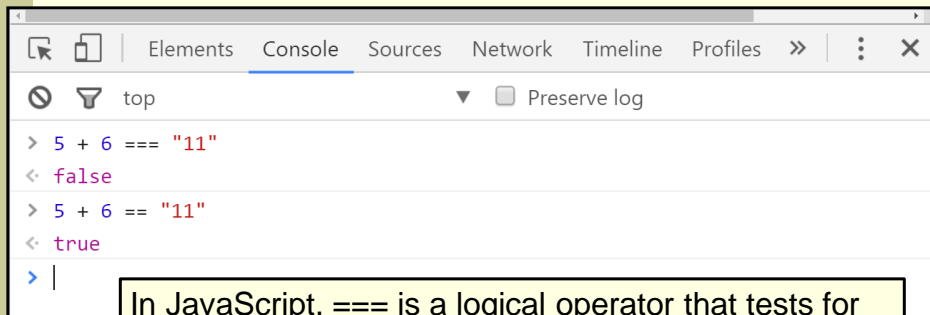
A Numerical expression evaluates to a number.

A Logical expression evaluates to **true** or **false**.

A Logical expression can contain a numerical expression

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Logical Operators == verses ===



```
> 5 + 6 === "11"  
< false  
> 5 + 6 == "11"  
< true  
> |
```

In JavaScript, === is a logical operator that tests for equality of the left and right side.

== is a logical operator that if the left and right are not the same data type, then before testing for equality, JavaScript will try to "cast" one of the types into the other.

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Quiz: What is displayed in the Console

```
var a = 10;  
var b = 13;  
a = a + 1;  
if (b > a)  
{  
  a = a + 7;  
}  
else if (b > 10)  
{  
  b = b - 5;  
}  
console.log(a + ", " + b);
```

- a) 18, 13
- b) 18, 8
- c) 26
- d) 17, 8
- e) 25

8

Quiz: What is displayed in the Console

```
var x = 5;
var z = 8;
x = x + 1;
if (x > z)
{
    x = x + 2;
}
else if (z > 5)
{
    z = z - 4;
}
console.log(x + ", " + z);
```

- a) 6, 1
- b) 5, 1
- c) 5, 4
- d) 6, 4
- e) 6, 6

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Quiz: What is displayed in the Console

```
var x = 5;
var z = 8;
x = x + 1;
if (x < z)
{
    x = x + 2;
}
else if (z > 5)
{
    z = z - 4;
}
console.log(x + ", " + z);
```

- a) 6, 1
- b) 8, 8
- c) 6, 8
- d) 6, 4
- e) 6, 6

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Quiz: What is displayed in the Console

```
var x = 5;
var z = 8;
if (x > z)
{
    x = x + 2;
    x = x + 1;
}
else if (z > 5)
{
    z = z - 4;
}
console.log(x + ", " + z);
```

- a) 6, 1
- b) 8, 8
- c) 6, 8
- d) 5, 4
- e) 6, 6

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Quiz: What is displayed in the Console

```
var x = 5;
var z = 3;
if (x + z === 8)
{
    x = x + 2;
    x = x + 1;
}
else if (z < 5)
{
    z = z - 1;
}
console.log(x + ", " + z);
```

- a) 5, 3
- b) 6, 3
- c) 7, 2
- d) 8, 2
- e) 8, 3

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Quiz: What is displayed in the Console

```
var x = 5;
var z = 3;
console.log(x % 3 + ", " + z % 3);
```

- a) 2, 0
- b) 5, 3
- c) 5%, 3%
- d) 0,05, 0.03
- e) 1.666667, 1

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Quiz: What is Displayed on the Canvas?

```
var zu = 5;
var chen = 4;
if (zu < chen)
{
    zu = chen;
}
if (zu > 10)
{
    zu = zu - 3;
}
fill(0, 0, 0);
textSize(100);
text(zu, 100, 100);
```

- a) 5
- b) 4
- c) 10
- d) 2
- e) 3

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Quiz: What is Displayed on the Canvas?

```
var zu = 5;
var chen = 17;
if (zu < chen)
{
    zu = chen;
}
if (zu > 10)
{
    zu = zu - 3;
}
fill(0, 0, 0);
textSize(100);
text(zu, 100, 100);
```

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- a) 4
- b) 5
- c) 10
- d) 14
- e) 17

Quiz: What is Displayed on the Canvas?

```
var zu = 5;
var chen = 17;
if (zu < chen)
{
    zu = chen;
}
if (zu < 10)
{
    zu = zu - 3;
}
fill(0, 0, 0);
textSize(100);
text(zu, 100, 100);
```

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- a) 4
- b) 5
- c) 10
- d) 14
- e) 17

Quiz: What is Displayed on the Canvas?

```
var zu = 5;
var chen = 4;
if (zu < chen)
{
    zu = chen;
}
else
{
    zu = zu - 3;
}
fill(0, 0, 0);
textSize(100);
text(zu, 100, 100);
```

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

17

Quiz: What is Displayed on the Canvas?

```
var zu = 5;
var chen = 4;
if (zu > chen)
{
    zu = chen;
}
else
{
    zu = zu - 3;
}
fill(0, 0, 0);
textSize(100);
text(zu, 100, 100);
```

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

18

Quiz: What is Displayed on the Canvas?

```
var zu = 5;  
var chen = 4;  
if (zu > chen)  
{  
    zu = chen;  
}  
else if (zu === chen)  
{  
    zu = zu - 3;  
}  
fill(0, 0, 0);  
textSize(100);  
text(zu, 100, 100);
```

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5