Introduction to Mathematical Operators and Functions

Things You Should Know

- Primitive C# data types
- Variable declarations

Types of Operators in C#

- Assignment Operator
- Mathematical Operators
- Comparison Operators
- Logical / Boolean Operators

Review of Assignment Operator

- Assignment operators may be used to assign values to declared variables

```
int x;
x = 0;
```

- It may also be used to assign values to a variable during variable declaration statements

```
float y = 99.99f;
```

Mathematical Operators

- These are C# operators that manipulate numerical data values of primitive numerical types like int, float, long, double, etc.
- These operators are further classified into two categories
  - Binary operators
  - Unary operators

Binary Operators

- Operators that works with two numerical operands
- The basic C# binary operators in mathematics are the following:
  - Addition: + (Add numbers)
  - Subtraction: - (Subtract numbers)
  - Multiplication: * (Multiply numbers)
  - Division: / (Divide numbers)
  - Modulo: % (Get remainder)

Example of Mathematical Binary Operators

- Addition – add 2 numbers together

```
float a = 2.0f + 5.0f;
//a gets the value 7.0f
```

- Subtraction – subtract 1 number from the other

```
int b = 100 – 10;
//b gets the value 90
```

Example of Mathematical Binary Operators

- Multiplication – multiply 2 numbers together

```
long c = 100 * 300;
//c gets the value 30000
```

- Division – divide 1 number by another

```
double d = 1000.0 / 5.0;
//d gets the value 200.0
```

Example of Mathematical Binary Operators

- Modulo – acquires the remainder after dividing 1 number by another

```
short e = 100 % 3;
//e gets the value 1
```

Unary Operators

- Operators that works with one numerical operands
- The basic C# unary operators in mathematics are the following:
  - Positive: + (Set number as positive)
  - Negative: - (Set number as negative)
  - Increment: ++ (Add 1 to current value)
  - Decrement: -- (Deduct 1 from current value)

Example of Mathematical Unary Operators

- Positive – set a number as having a positive value

```
float pi = +3.14159f;
```

- Negative – set a number as having a negative value

```
int some_number = -12;
```

Example of Mathematical Unary Operators

- Increment – add 1 to current value (for variables only)

```
double a = 0.0;
a++;
```

- Decrement – subtract 1 from current value (for variables only)

```
a--;
```

Tricks of the Trade

- Substitute for the Increment and Decrement unary operators are the following:

```
int p = 0;
//adds 1 to the value of p
p = p + 1;
//add 9 to the current value of p
p = p + 9;
//add 2 to the current value of p
p += 2;
//subtract 5 from the current value of p
p -= 5;
```

Summary of Assignment Operators

Basic Assignment	Mathematical Re-assign Operators

- Assignment (=)
`int x;`
`x = 0;`
`float y = 0.0f;`
	- Increment Re-assign (+=)
	- Decrement Re-assign (-=)
	- Multiply Re-assign (*=)
	- Divide Re-assign (/=)

Summary of Mathematical Operators

Binary Operators	Unary Operators
- Addition (+) - Subtraction (-) - Multiplication (*) - Division (/) - Modulo (%)	- Positive (+) - Negative (-) - Increment (++) - Decrement (--)