**1. Arithmetic Operators**

Used for mathematical operations.

| **Operator** | **Description** | **Example** |
| --- | --- | --- |
| + | Addition | 3 + 2 → 5 |
| - | Subtraction | 5 - 3 → 2 |
| \* | Multiplication | 2 \* 3 → 6 |
| / | Division | 10 / 2 → 5.0 |
| % | Modulus (remainder) | 10 % 3 → 1 |
| \*\* | Exponentiation | 2 \*\* 3 → 8 |
| // | Floor Division | 10 // 3 → 3 |

**2. Comparison Operators**

Used to compare two values.

| **Operator** | **Description** | **Example** |
| --- | --- | --- |
| == | Equal to | 3 == 3 → True |
| != | Not equal to | 3 != 2 → True |
| > | Greater than | 5 > 3 → True |
| < | Less than | 5 < 3 → False |
| >= | Greater than or equal to | 5 >= 5 → True |
| <= | Less than or equal to | 5 <= 3 → False |

**3. Logical Operators**

Used to combine conditional statements.

| **Operator** | **Description** | **Example** |
| --- | --- | --- |
| and | True if both are true | (5 > 3) and (2 < 4) → True |
| or | True if at least one is true | (5 > 3) or (2 > 4) → True |
| not | Inverts the result | not (5 > 3) → False |

**4. Assignment Operators**

Used to assign values to variables.

| **Operator** | **Description** | **Example** |
| --- | --- | --- |
| = | Assign | x = 5 |
| += | Add and assign | x += 3 → x = x + 3 |
| -= | Subtract and assign | x -= 2 → x = x - 2 |
| \*= | Multiply and assign | x \*= 2 → x = x \* 2 |
| /= | Divide and assign | x /= 2 → x = x / 2 |
| %= | Modulus and assign | x %= 2 → x = x % 2 |
| \*\*= | Exponent and assign | x \*\*= 2 → x = x \*\* 2 |
| //= | Floor divide and assign | x //= 2 → x = x // 2 |

**5. Bitwise Operators**

Used to perform operations on binary numbers.

| **Operator** | **Description** | **Example** |
| --- | --- | --- |
| & | AND | 5 & 3 → 1 |
| ` | ` | OR | `5 | 3→7` |
| ^ | XOR | 5 ^ 3 → 6 |  |  |
| ~ | NOT (inverts bits) | ~5 → -6 |  |  |
| << | Left shift | 5 << 1 → 10 |  |  |
| >> | Right shift | 5 >> 1 → 2 |  |  |

**6. Membership Operators**

Used to test if a value is present in a sequence (e.g., list, string).

| **Operator** | **Description** | **Example** |
| --- | --- | --- |
| in | True if value is present | 'a' in 'apple' → True |
| not in | True if value is not present | 'b' not in 'apple' → True |

**7. Identity Operators**

Used to compare the memory locations of two objects.

| **Operator** | **Description** | **Example** |
| --- | --- | --- |
| is | True if both are the same object | x is y → True if x and y point to the same object |
| is not | True if both are not the same object | x is not y → True if x and y are different objects |