JS - Math Manipulation

1. Basic Math Operations

JavaScript provides basic arithmetic operators for math manipulation:

```
// Arithmetic Operators
let num1 = 10;
let num2 = 5;

let sum = num1 + num2; // 15 (Addition)
let difference = num1 - num2; // 5 (Subtraction)
let product = num1 * num2; // 50 (Multiplication)
let quotient = num1 / num2; // 2 (Division)
let remainder = num1 % num2; // 0 (Modulus)

// Exponentiation
let power = num1 ** num2; // 100000 (Exponentiation: 10 raised to the power of 5)

// Increment and Decrement
num1++; // num1 becomes 11
num2--; // num2 becomes 4
```

2. Common Math Methods

JavaScript has a built-in `Math` object that provides a variety of methods for performing mathematical operations. Below are some of the most commonly used math methods:

2.1. `Math.round()`

The `Math.round()` method rounds a number to the nearest integer.

```
let num = 4.7;
let rounded = Math.round(num); // 5
```

2.2. `Math.floor()`

The `Math.floor()` method returns the largest integer less than or equal to a given number (rounds down).

```
let num = 4.7;
let floored = Math.floor(num); // 4
```

2.3. `Math.ceil()`

The `Math.ceil()` method returns the smallest integer greater than or equal to a given number (rounds up).

```
let num = 4.2;
let ceiled = Math.ceil(num); // 5
```

2.4. `Math.abs()`

The `Math.abs()` method returns the absolute value of a number (removes the sign).

```
let num = -10;
let absolute = Math.abs(num); // 10
```

2.5. `Math.max()` and `Math.min()`

The `Math.max()` method returns the largest of zero or more numbers, and `Math.min()` returns the smallest number.

```
let max = Math.max(10, 20, 30, 5); // 30
let min = Math.min(10, 20, 30, 5); // 5
```

2.6. `Math.random()`

The `Math.random()` method generates a random floating-point number between 0 (inclusive) and 1 (exclusive).

```
let random = Math.random(); // Random number between 0 and 1
```

2.7. `Math.pow()`

The `Math.pow()` method returns the base raised to the exponent power, i.e., `base ^ exponent`.

```
let power = Math.pow(2, 3); // 8 (2 raised to the power of 3)
```

2.8. `Math.sqrt()`

The `Math.sqrt()` method returns the square root of a number.

```
let num = 16;
let squareRoot = Math.sqrt(num); // 4
```

2.9. `Math.trunc()`

The `Math.trunc()` method returns the integer part of a number by removing any fractional digits.

```
let num = 4.9;
let truncated = Math.trunc(num); // 4
```

2.10. `Math.sign()`

The `Math.sign()` method returns the sign of a number, indicating whether the number is positive, negative, or zero.

```
let num = -10;
let sign = Math.sign(num); // -1 (indicates negative)
```

3. Summary of Math Methods

Method	Example	Description
Math.round()	Math.round(4.7)	Rounds a number to the nearest integer.
Math.floor()	Math.floor(4.7)	Rounds down to the nearest integer.
Math.ceil()	Math.ceil(4.2)	Rounds up to the nearest integer.
Math.abs()	Math.abs(-10)	Returns the absolute value of a number.
Math.max()	Math.max(10, 20, 30)	Returns the largest of the provided numbers.
Math.min()	Math.min(10, 20, 30)	Returns the smallest of the provided numbers.
Math.random()	Math.random()	Returns a random floating-point number between 0 and 1.
Math.pow()	Math.pow(2, 3)	Returns base raised to the power of exponent.
Math.sqrt()	Math.sqrt(16)	Returns the square root of a number.
Math.trunc()	Math.trunc(4.9)	Returns the integer part of a number (removes fractional part).
Math.sign()	Math.sign(-10)	Returns the sign of a number (-1, 1, or 0).