

# Spread Operator ( ... )

The **spread operator** ( ... ) expands elements of an array or properties of an object.

## 1. Spread in Arrays

- Used to copy or merge arrays.

```
let arr1 = [1, 2, 3];
let arr2 = [4, 5, 6];

// Merging arrays
let mergedArray = [...arr1, ...arr2];
console.log(mergedArray); // [1, 2, 3, 4, 5, 6]

// Copying an array
let copiedArray = [...arr1];
console.log(copiedArray); // [1, 2, 3]
```

## 2. Spread in Objects

- Used to copy or merge objects.

```
let obj1 = { name: "Alice", age: 25 };
let obj2 = { city: "New York" };

// Merging objects
let mergedObject = { ...obj1, ...obj2 };
console.log(mergedObject); // { name: "Alice", age: 25, city: "New York" }

// Copying an object
let copiedObject = { ...obj1 };
console.log(copiedObject); // { name: "Alice", age: 25 }
```

## 3. Spread in Function Arguments

- Expands an array into function arguments.

```
function sum(a, b, c) {  
  return a + b + c;  
}  
  
let numbers = [1, 2, 3];  
console.log(sum(...numbers)); // 6
```

## Rest Parameters ( ... )

Rest parameters **collect multiple arguments into an array**.

### 1. Using Rest Parameters in Functions

```
function sum(...numbers) {  
  return numbers.reduce((acc, num) => acc + num, 0);  
}  
  
console.log(sum(1, 2, 3, 4)); // 10
```

### 2. Rest Parameters in Destructuring

```
let [first, second, ...rest] = [10, 20, 30, 40, 50];  
console.log(first); // 10  
console.log(second); // 20  
console.log(rest); // [30, 40, 50]
```

## Arguments Object

The `arguments` object is an **array-like object** that holds function arguments (not available in arrow functions).

# 1. Using arguments in Functions

```
function showArgs() {  
  console.log(arguments); [Arguments] { '0': 1, '1': 2, '2': 3 }  
  console.log(Array.from(arguments)); [1, 2, 3]  
  
}  
  
showArgs(1, 2, 3);
```

# 2. Converting arguments to an Array

```
function sumAll() {  
  let argsArray = Array.from(arguments);  
  return argsArray.reduce((acc, num) => acc + num, 0);  
}  
  
console.log(sumAll(1, 2, 3, 4)); // 10
```

## Key Differences

Feature	Spread ( ... )	Rest ( ... )	arguments
Usage	Expands elements	Collects elements	Holds all arguments
Works in	Arrays, Objects, Functions	Function parameters	Regular functions
Returns	Individual values	An array	Array-like object
Arrow Function Support	Yes	Yes	No

# Conclusion

- **Spread ( ... )** expands elements.
- **Rest ( ... )** collects elements.
- **arguments** is an old way to handle function arguments.

Use **spread** for expansion, **rest parameters** for flexible functions, and avoid `arguments` in favor of rest parameters for better readability and functionality.