1.
```
function findMissingNumber(arr) {
  const n = arr.length + 1;
  const totalSum = (n * (n + 1)) / 2;

  const arraySum = arr.reduce((acc, curr) => acc + curr, 0);

  const missingNumber = totalSum - arraySum;

  return missingNumber;
}

const inputArray = [1, 2, 3, 4, 6, 7, 8];
console.log("Missing Number:", findMissingNumber(inputArray));

const testInputArray = [1, 3, 4, 5, 6, 7, 8, 9, 10];
console.log("Missing Number in Test Input:", findMissingNumber(testInputArray));
```

2.
```
function removeDuplicates(nums) {
  if (nums.length === 0) return 0;

  let i = 0; // Pointer for unique elements
  for (let j = 1; j < nums.length; j++) {
    if (nums[j] !== nums[i]) {

      i++; // Move pointer to the next unique element
      nums[i] = nums[j];
    }
  }
  return i + 1; // Length of the array up to index i (including i)
}

const inputArray = [1, 1, 2, 2, 3, 4, 4, 5];
console.log("New Length:", removeDuplicates(inputArray));

const testInputArray = [1, 1, 1, 2, 2, 3, 3, 3, 4, 5];
console.log("New Length in Test Input:", removeDuplicates(testInputArray));
```

3.
```
function factorial(n) {

  if (n === 0 || n === 1) {
    return 1;
  }


  return n * factorial(n - 1);
}


const n1 = 5;
console.log("Factorial of", n1 + ":", factorial(n1));
```

```
const n2 = 10;
console.log("Factorial of", n2 + ":", factorial(n2));

4.
function rotateArray(arr, k) {

  reverseArray(arr, 0, arr.length - 1);

  reverseArray(arr, 0, k - 1);


  reverseArray(arr, k, arr.length - 1);

  return arr;
}

function reverseArray(arr, start, end) {
  while (start < end) {
    const temp = arr[start];
    arr[start] = arr[end];
    arr[end] = temp;
    start++;
    end--;
  }
}


const inputArray = [1, 2, 3, 4, 5, 6, 7];
const k = 3;
console.log("Rotated Array:", rotateArray(inputArray.slice(), k));


const testArray = [3, 8, 9, 2, 5];
const k2 = 2;
console.log("Rotated Array:", rotateArray(testArray.slice(), k2));
```