**🧠 CHALLENGE SET — “Think Like a Problem Solver” (Set #1)**

There are 8 problems — mix of **Easy, Medium, Hard** — and they all connect to what you’ve already learned, but you have to figure out *which concept fits*.

**🧩 Q1.**

You are given an integer array nums and an integer k.  
Return the **number of subarrays** whose sum is exactly equal to k.

Example:  
nums = [1, 2, 3], k = 3 → Output: 2  
(because [1,2] and [3])

🧠 *Hint:* None. Think prefix logic + something efficient.

**⚙️ Q2.**

Given a sorted array of integers nums, return the **starting and ending index** of a given target value.  
If the target is not found, return [-1, -1].

Example:  
nums = [5,7,7,8,8,10], target = 8 → Output: [3,4]

🧠 *Hint:* Two smart searches, not just one.

**🔍 Q3.**

You are given an array of integers.  
Find the **maximum sum of any contiguous subarray**.

Example:  
[-2,1,-3,4,-1,2,1,-5,4] → Output: 6 (subarray [4,-1,2,1])

🧠 *Hint:* Pure array thinking — no extra space needed if done cleverly.

**🧮 Q4.**

You are given a binary array (only 0s and 1s).  
Find the **length of the longest subarray with equal number of 0s and 1s**.

Example:  
[0,1,0,0,1,1,0] → Output: 6 (subarray [1..6])

🧠 *Hint:* Convert, track, balance — think difference, not just counting.

**⚖️ Q5.**

Given a sorted array of positive integers and a target k,  
find two numbers such that they add up to k.  
Return their indices (1-indexed).

Example:  
nums = [2,7,11,15], k = 9 → Output: [1,2]

🧠 *Hint:* Don’t use brute force; the array’s property helps you.

**🔢 Q6.**

Given an array nums, return true if there exists a **continuous subarray of size at least 2**  
whose sum is a multiple of k.

Example:  
nums = [23, 2, 4, 6, 7], k = 6 → Output: true

🧠 *Hint:* Sums repeat in a certain way when divided by k.

**🧭 Q7.**

Given an array nums, find the **length of the longest subarray** that sums to exactly k.

Example:  
nums = [10,5,2,7,1,9], k = 15 → Output: 4 (subarray [5,2,7,1])

🧠 *Hint:* Not just counting — need to maximize length efficiently.

**🧱 Q8. (Challenge)**

You are given an integer array (can have negatives).  
Find the **shortest subarray** whose sum ≥ k.  
If none, return -1.

Example:  
nums = [2,-1,2], k = 3 → Output: 3

🧠 *Hint:* Prefix-based, but tricky — simple sliding window fails here.