Squishy Peas in a Pod

This fall, your school had the wonderful idea of organizing an outing involving the high schoolers for a change, which is how you and your classmates ended up in a pea farm of all places. Oh but it's not just any pea farm, it's a special pea farm where the locals have a very fun game involving their squishy peas.

The game centers around two elements, mainly: the first is the pea, a green ball with an empty number tag which you will be asked to fill; the second element is the pod, a cylindrical container which can hold between 2 and **K** ($2 \leq \mathbf{K} \leq 50$) peas. A pod that can hold **i** peas is said to be a pod of **i** peas.

There are two types of pods, red and blue pods: by putting numbered peas in a red pod and pressing the two ends together (thereby "squishing" it) you get a new pea whose number is the sum of the numbers of all peas that were squished; by squishing a blue pod instead, you get the product of those numbers.

For example, let's say you had a red pod of 3 peas numbered 1, 3 and 3: squishing it would result in a pea numbered 7, because (1 + 3 + 3) = 7. If it were a blue pod, the result would be 9, as (1 * 3 * 3) = 9.

The rules are simple:

- You are given a list **Z** of **K** numbers ($2 \leq K \leq 50$ and $1 \leq \mathbf{Z}_1, \ldots, \mathbf{Z}_K \leq 50$), and a string consisting of brackets "(" and ")", additions "+", multiplications " * ", question marks "?" and numbers. Each pair of brackets describes a pod:
    - A red pod of **i** elements is written like so: "(x + x + ... + x)", where eachx is either another pod or a question mark to denote that a numbered pea must be placed.
    - Similarly, a blue pod is written like so: "(x * x * ... * x)" with the same expectation of x being filled by either a question mark or a string describing another pod.
- The first number $\mathbf{Z}_1$ denotes the highest number you can write on a pea. You can only write positive real numbers on any given pea's number tag.
- The subsequent numbers $\mathbf{Z}_2$, $\mathbf{Z}_3$, ..., $\mathbf{Z}_K$ all denote a limit for the peas you can put on a pod: for both types (red and blue), the sum of the numbers on the peas to be squished in a pod of **i** peas must be less than or equal to $\mathbf{Z}_i$. Formally, if there are peas numbered $\mathbf{A}_1$, $\mathbf{A}_2$, ..., $\mathbf{A}_i$, then a pod containing all of these peas is only squishable if $\mathbf{A}_1 + \mathbf{A}_2 + \ldots + \mathbf{A}_i \leq \mathbf{Z}_i$.

Note that in strings where pods are contained within pods, the inner pods are squished before being replaced as numbered peas within their outer pod, so the rules of squishing apply to them individually as well.

Find the largest value you can get from squishing a pod of a given form, given the list **Z** and the string of characters that describes said pod. It is guaranteed that this string of characters has 1 000 000 characters or less. The float you

will return should be within 10^{-3} of the answer to get a correct verdict.

Examples

Example 1

Input:

```
2
4 6
((?) + (?))
```

Output:

```
6.000000
```

Example 2

Input:

```
3
2 5 3
(((?) + (?)) * (?))
```

Output:

```
6.000000
```

Example 3

Input:

```
3
2 10 6
((?) * (?) * (?))
```

Output:

```
8.000000
```

Explanation of test cases

In the first example, the most you can get out of squeezing a pod of 2 peas is 6, which can be achieved by putting one pod numbered 4 and another pod numbered 2. The result is: `((2) + (4)) = 6.`

In the second example, the maximal value can be found by using peas numbered 1, 2 and 2:`(((1) + (2)) \* (2)) = ((3) \* (2)) = 6.`

In the final example, the maximum value can be found by numbering all peas with 2: `((2) \* (2) \* (2)) = 8.`