10719   Quotient Polynomial

A polynomial of degree n can be expressed as

$$p(x) = a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0$$

If k is any integer then we can write:

$$p(x) = (x - k)q(x) + r$$

Here $q(x)$ is called the quotient polynomial of $p(x)$ of degree $(n - 1)$ and r is any integer which is called the remainder.

For example, if $p(x) = x^3 - 7x^2 + 15x - 8$ and $k = 3$ then $q(x) = x^2 - 4x + 3$ and $r = 1$. Again if $p(x) = x^3 - 7x^2 + 15x - 9$ and $k = 3$ then $q(x) = x^2 - 4x + 3$ and $r = 0$.

In this problem you have to find the quotient polynomial $q(x)$ and the remainder r. All the input and output data will fit in 32-bit signed integer.

Input

Your program should accept an even number of lines of text. Each pair of line will represent one test case. The first line will contain an integer value for k. The second line will contain a list of integers $(a_n, a_{n-1}, \ldots, a_0)$, which represent the set of co-efficient of a polynomial $p(x)$. Here $1 \leq n \leq 10000$. Input is terminated by <EOF>.

Output

For each pair of lines, your program should print exactly two lines. The first line should contain the coefficients of the quotient polynomial. Print the reminder in second line. There is a blank space before and after the '=' sign. Print a blank line after the output of each test case. For exact format, follow the given sample.

Sample Input

```
3
1 -7 15 -8
3
1 -7 15 -9
```

Sample Output

```
q(x): 1 -4 3
r = 1

q(x): 1 -4 3
r = 0
```