Finding Minimum

You are given 'n' integers k_1, k_2, ..., k_n and an integer 'x', which satisfy the equation $x_1^{k_1} * x_2^{k_2} *$ ..... $* x_n^{k_n} = x$. You are also given values a_1, a_2, ..., a_n and y_1, y_2, ..., y_n. Your task is to find the least positive value 'v', that can be taken by the expression: $a_1*x_1^{y_1} + a_2*x_2^{y_2} + ... + a_n*x_n^{y_n}$. Note that x_1, x_2, x_3, ... x_n are some variables (not necessarily integers), which can only take positive values.

Input

The first line of input contains a single integer 't', denoting the number of test cases.
The first line of each testcase contains two space separated integers 'n' and 'x'.
Next line contains 'n' integers k_1, k_2, ..., k_n.
Next line contains 'n' integers a_1, a_2, ..., a_n.
Next line contains 'n' integers y_1, y_2, ..., y_n.

Output

For each testcase output the least positive value 'v' that can be taken by the expression. To avoid floating point errors, round it off to the nearest integer.

For example, 12.6 is rounded off to 13, and 12.4 is rounded off to 12. To avoid ambiguity, there will be no test case for which the fractional part of the answer equals 0.5.

Example

Input:
2
1 4
2
3
3
2 6
1 1
1 1
1 1

Output:
24
5

Constraints:
t <= 25
1 <= n <= 20
1 <= x <= 1000000
1 <= k_i, a_i, y_i <=20
x_i > 0

Explanation:

Test case 1: $x_1^2 = 4$. Therefore, $x_1 = 2$ and $3*x_1^3 = 24$.
Test case 2: $x_1*x_2 = 6$. Minimum value of $x_1 + x_2$ is 2*sqrt(6) = 4.89897. x_1 = sqrt(6) and x_2 = sqrt(6) gives this solution. Answer is 4.89897, which when rounded off to the nearest integer equals 5.