Let $x_1, x_2, \ldots, x_m$ be real numbers satisfying the following conditions:

a) $\frac{1}{\sqrt{a}} \le x_i \le \sqrt{5}$;

b) $x_1 + x_2 + \ldots + x_m = b * \sqrt{a}$ for some integers a and b ($a > 0$).

   Determine the maximum value of $x_1^p + x_2^p + \ldots + x_m^p$ for some even positive integer p.

Input

Each input line contains four integers: m, p, a, b ($m \le 2000, p \le 12$, p is even). Input is correct, i.e. for each input numbers there exists $x_1, x_2, \ldots, x_m$ satisfying the given conditions.

Output

For each input line print one number — the maximum value of expression, given above. The answer must be rounded to the nearest integer.

Sample Input

```
1997 12 3 -318
10 2 4 -1
```

Sample Output

```
189548
6
```