Project Euler #235: An Arithmetic Geometric sequence

This problem is a programming version of Problem 235 from projecteuler.net

Given is the arithmetic-geometric sequence $u(k) = (a - d \times k)r^{k-1}$.

Let $s(n) = \sum_{k=1}^{n} u(k)$.

Find the value of r for which $s(n) = -x$.

Give your answer rounded to 12 places behind the decimal point.

Input Format

First line of each test file contains a single integer q which is the number of queries per test file. q lines follow, each containing exactly four integers separated by single spaces which are a, d, n and x.

Constraints

- $1 \leq q \leq 1000$
- $1 \leq a \leq 1000$
- $1 \leq d \leq 10$
- $3000 \leq n \leq 4000$
- $1 < x \leq 10^{15}$

Output Format

Print exactly q numbers on the separate lines that are the r's for the corresponding tests. Your answers will be considered as correct if they coincide with the author's ones in 12 digits after the decimal point.

Sample Input 0

```
1
1 1 3000 100000000
```

Sample Output 0

```
1.00136521495144
```