

Singhal and Numbers

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 256 megabytes

Yestarday, Singhal went to a shop. The shop owner is a mathematician and has a unique style of costing the items costumer bought.

If a item has a initial price $X(X \geq 2)$, then costumer can bought N items of this price if $X \pmod{N} = 0$ and $1 \leq N \leq X - 1$.

Example - If a item cost $X = 10$, then costumer can buy these (1, 2, 5) numbers of items of this price.

If a item cost $X = 12$, then costumer can buy these (1, 2, 3, 4, 6) numbers of items.

The shop owner will then calculates the total cost of N items as -

1) if N is Prime , cost will be

$$A + \frac{X}{N}$$

2) if N is Composite , cost will be

$$B + \frac{X}{N}$$

3) if N is 1 , cost will be

$$C + \frac{X}{N}$$

Defn of Prime and Composite number - <https://www.mathsisfun.com/prime-composite-number.html>.

You know the value of A, B, C and X . Help him to buy N number of items of price X so that cost will be minimum possible.

You don't have to minimize the number of items , only minimize the total cost.

Input

The first line contains a single integer $t(1 \leq t \leq 10^5)$ — the number of test cases in the input. Then t test cases follow.

Each query contains two lines. The first line contains a integer $X(2 \leq X \leq 10^7)$: Price of item , and the second line contains $A, B, C(1 \leq A, B, C \leq 10^9)$.

Output

Print t answers to the test cases. Each answer must be consisting of single integer — the minimum possible cost.

Example

standard input	standard output
3	6
12	5
2 5 1	13
12	
2 3 1	
12	
15 15 1	

Note

In the first query, possible numbers of items he can buy is (1, 2, 3, 4, 6).

Cost for each N is —

$$N = 1 - C + \frac{X}{N} \text{ i.e. } 1 + \frac{12}{1} = 13$$

$$N = 2 - 2 + \frac{12}{2} = 8$$

$$N = 3 - 2 + \frac{12}{3} = 6$$

$$N = 4 - 5 + \frac{12}{4} = 8$$

$$N = 6 - 5 + \frac{12}{6} = 7$$

Minimum cost from this will be - 6.

In the second query, possible numbers of items he can buy is (1, 2, 3, 4, 6) and Cost for each N will be (13, 8, 6, 6, 5) respectively.

In the third query, possible numbers of items he can buy is (1, 2, 3, 4, 6) and Cost for each N will be (13, 21, 19, 18, 17) respectively.