Henry and Lost Ranges

Henry is a curious little boy. He likes to play around with numbers. One day, he defined a function ***f*** for natural numbers such that:

f(X) = largest prime factor of **X** , where **X > 1**

For example: f(2) = 2
f(3) = 3
f(75) = 5

Now, Henry selected two integers **A** and **B** (**A ≤ B**) and counted all numbers **X** between **A** and **B** (both inclusive) such that **f(X) = K**. He found out that there are **N** such numbers.
After that Henry went for playing. When he returned home, he found out that he had forgotten the upper limit of range i.e. the integer **B**. However, he remembers all other numbers i.e. **A**, **K** and **N**.
Henry wants to find out **B** as soon as possible. Can you help him finding it ?

Note:

- If there are multiple possible values of **B**, output the **least** value out of those.
- It is assured that the input will be in such a way that final value of **B** will be within the range of **long long int**.

Input

First line of input contains **T**, the number of test cases.
The only line of each test case contains three integers **A**, **K** and **N**.

Output

For each test case, output a single line containing the integer **B**.

Constraints

- **1 ≤ T ≤ 5**
- **2 ≤ A ≤ 10^9**
- **2 ≤ K ≤ 11** and **K** is a **prime** number
- **0 ≤ N ≤ 152319**

Example

Input:

5
3 2 4
5 3 4
4 5 4
5 7 4
3 11 4

Output:
32
18
20
28
44

Explanation

In the first case, least value of **B** such that there are exactly **4** numbers having largest prime factor as **2** in range **[3,B]** will be **32** (the **4** numbers are **4, 8, 16, 32**).
In the second case, least value of **B** such that there are exactly **4** numbers having largest prime factor as **3** in range **[5,B]** will be **18** (the **4** numbers are **6, 9, 12, 18**).
In the third case, least value of **B** such that there are exactly **4** numbers having largest prime factor as **5** in range **[4,B]** will be **20** (the **4** numbers are **5, 10, 15, 20**).
In the fourth case, least value of **B** such that there are exactly **4** numbers having largest prime factor as **7** in range **[5,B]** will be **28** (the **4** numbers are **7, 14, 21, 28**).
In the fifth case, least value of **B** such that there are exactly **4** numbers having largest prime factor as **11** in range **[3,B]** will be **44** (the **4** numbers are **11, 22, 33, 44**).