

Pencil Game

Minh has a box of pencils. The box is a rectangle of size $M \times N$, where position (i, j) has a pencil with a length of exactly $i \times N + j$ ($0 \leq i \leq M-1$, $0 \leq j \leq N-1$). Note that position $(0, 0)$ does not have any pencil hence having a length of 0.

He wonders if he could select a sub-rectangle of the box and join all the pencils within that sub-rectangle together, to get a new long pencil that has a specific length L that he wants.

Your task is to find a sub-rectangle of the box in which the total length of the contained pencils is L and return the area of that the sub-rectangle. If there are multiple solutions, return the smallest possible area. If there's no such sub-rectangle, return -1.

Input

The input file consists of several datasets. The first line of the input file contains the number of datasets which is a positive integer and is not greater than 150. The following lines describe the datasets.

Each dataset contains three space-separated numbers M , N and L ($1 \leq M, N \leq 10^6$, $1 \leq L \leq 10^{12}$) written in one line.

Output

For each dataset, write in one line the smallest possible area of the sub-rectangle in which the total sum of pencil lengths is L . Write in one line -1 if there is no such sub-rectangle.

Example

Input:

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2
2 3 8
2 2 7
```

Output:

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4
-1
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