

Basic Math 3

Task: You are given $U, V, W \in \{1, \dots, 5 \cdot 10^{18}\}$. We define

$$S = \{(x, y, z) \in \mathbb{Z}^3 : (x \neq y) \wedge (x \neq z) \wedge (y \neq z) \\ \wedge (x + y + z = U) \wedge (xyz = V) \wedge (x^2 + y^2 + z^2 = W)\}.$$

Output the lexicographic smallest element in S . In case that S is empty, print “empty set”.

Note: This task is identical to **basicMath2** but the test cases are more challenging.

Input: There will be several test cases concatenated. The first line contains a positive integer $n \leq 300$ that specifies the number of test cases. In each of the following n lines a test case will be described. A test case will be described by U, V, W .

Output: For each test case print in a single line x, y and z . If S is empty, print “empty set”.

Sample Input:

```
3
1 1 1
88 1136 5298
42 420 842
```

Sample Output:

```
empty set
1 16 71
1 20 21
```