

## 6. Cake cutting (tort)

1 sec / 10 sec

60 points

Kolya's grandmother from the cartoon "The Mystery of the Third Planet" baked a "small" rectangular cake. Since Kolya has many friends to share it with, the cake is really rather large.<sup>1</sup> Kolya wanted to help his grandmother and cut the cake into unit squares. But he did not know that she still wanted to cover the cake with whipped cream.

The grandmother, not noticing Kolya's cuts, covered the cake with cream and cut it again. She is, however, a very old, very wise, and very artistic woman and cuts cakes in her own unique way. Specifically, she makes slanted cuts that form a square pattern among themselves, with the following rules:

- The area of the squares formed by her cuts is always an integer.
- Her first cut (diagonally up and to the right) starts from the lower left corner of the cake.
- The first cut crossing it (diagonally down and to the right) intersects with it at the distance equal to the side length of the square of her pattern.

Into how many pieces did Kolya and his grandmother cut the cake?

**Input.** The only line of the file `tortsis.txt` contains five integers. First are  $M$  ( $1 \leq M \leq 10^9$ ), the length of the cake (from left to right), and  $N$  ( $1 \leq N \leq 10^9$ ), the width of the cake (from top to bottom). Thus, Kolya cuts the cake into  $M \times N$  pieces.

Next is  $S$  ( $1 \leq S \leq 10^9$ ), the area of the squares of grandmother's cuts. Note that this only applies to the pieces that are complete squares. As her cuts are slanted relative to the edges of the cake, some pieces are smaller than  $S$ .

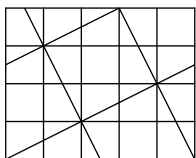
The last two numbers,  $P$  and  $Q$  ( $1 \leq P \leq 10^3$ ,  $1 \leq Q \leq 10^3$ ), describe the angle of her cuts. These mean that grandmother's first cut is made in the direction of the point that is  $P$  units to the right and  $Q$  units up from the corner. In other words, the angle between Kolya's and grandmother's cuts is  $\text{atan}(\frac{Q}{P})$ .

In the late 22-nd century, when the story takes place, a new quantum law for cake cutting has been found:  $\frac{S}{P^2+Q^2}$  is always a square of some rational number.

**Output.** The only line for the file `tortval.txt` should contain a single integer: the total number of pieces into which the cake is cut by Kolya's and his grandmother's cuts.

**Example.**

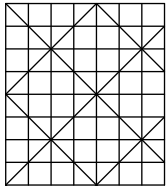
<code>tortsis.txt</code>	<code>tortval.txt</code>
5 4 5 2 1	36



**Example.**

<code>tortsis.txt</code>	<code>tortval.txt</code>
7 8 8 1 1	84

<sup>1</sup><https://www.youtube.com/watch?v=2TAmISW76Rk&t=193>



**Example.**        `tortsis.txt`        `tortval.txt`  
                  8 12 52 2 3        122

**Example.**        `tortsis.txt`        `tortval.txt`  
                  3 3 5 11 2        21

**Grading.** Test cases where  $S = P^2 + Q^2$  are worth 30 points in total, and among them:

- tests where  $M \leq 50$ ,  $N \leq 50$ ,  $P \leq 50$ ,  $Q \leq 50$  are worth 10 points;
- tests where  $M \leq 1000$ ,  $N \leq 1000$  are worth additional 10 points;
- tests with no additional limits are worth another 10 points.

Test cases where  $S \neq P^2 + Q^2$  are worth 30 points in total, and among them:

- tests where  $M \leq 50$ ,  $N \leq 50$ ,  $P \leq 50$ ,  $Q \leq 50$  are worth 10 points;
- tests where  $M \leq 1000$ ,  $N \leq 1000$  are worth additional 10 points;
- tests with no additional limits are worth another 10 points.