Problem I. Zombie Land

Input file:	*standard input*
Output file:	*standard output*
Time limit:	8 seconds
Memory limit:	512 mebibytes

Your friend, Tatsumi, is a producer of Immortal Culture Production in Chiba (ICPC). His company is planning to form a zombie rock band named Gray Faces and cheer Chiba Prefecture up.

But, unfortunately, there is only one zombie in ICPC. So, Tatsumi decided to release the zombie on a platform of Soga station to produce a sufficient number of zombies. As you may know, a zombie changes a human into a new zombie by passing by the human. In other words, a human becomes a zombie when the human and a zombie are at the same point. Note that a zombie who used to be a human changes a human into a zombie too.

The platform of Soga station is represented by an infinitely long line, and Tatsumi will release a zombie at a point with coordinate x_Z. After the release, the zombie will start walking in the positive direction at v_Z per second. If v_Z is negative, the zombie will walk in the negative direction at $|v_Z|$ per second.

There are N humans on the platform. When Tatsumi releases the zombie, the i-th human will be at a point with coordinate xi and will start walking in the positive direction at vi per second. If v_i is negative, the human will walk in the negative direction at $|vi|$ per second as well as the zombie.

For each human on the platform, Tatsumi wants to know when the human becomes a zombie. Please help him by writing a program that calculates a time when each human on the platform becomes a zombie.

Input

The first line of the input consists of an integer N ($1 \le N \le 2 \cdot 10^5$) which is the number of humans on a platform of Soga station. The second line consists of two integers x_Z ($-10^9 \le x_Z \le 10^9$) and v_Z($-10^9 \le v_Z \le 10^9$) separated by a space, where x_Z is an initial position of a zombie Tatsumi will release and v_Z is the velocity of the zombie.

The i-th line in the following N lines contains two integers x_i ($-10^9 \le x_i \le 10^9$) and v_i ($-10^9 \le v_i \le 10^9$) separated by a space, where the x_i is an initial position of the i-th human and v_i is the velocity of the human. There is no human that shares their initial position with the zombie. In addition, initial positions of the humans are different from each other.

Output

Print N lines. In the i-th line, print how many seconds it will take for the i-th human to become a zombie. If the i-th human will never become a zombie, print 1 instead. The answer will be considered as correct if the values output have an absolute or relative error less than 10^{-9}.

Examples

standard input	standard output
6	3.66666666666667
3 1	2.00000000000000
-5 0	-1
5 0	6.00000000000000
-4 -3	0.75000000000000
0 -2	2.00000000000000
6 -3	
2 -1	
5	13.67821522309711
31415 -926	95.61812216052499
5358 979	52.41629112212708
323846 26	33.76030368763558
-433832 7950	38.95682613768962
288 -4	
-1971 -69	