See the Sights on the Flights

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	256 megabytes

Dima is an architect. He is also a photographer. He spends his time on travelling around the world and making photos of cool buildings like Big Ben etc.

This time Dima went to Berland famous with its subway system. It consists of n lines, each of which is represented with a line on the map of the city. For any two lines there is a subway station in their intersection point, those station entrances are considered to be the notable pieces of architecture. Dima decided to take a photo of them.

In order to take the panoramic photo, he is going to use a helicopter flight. Helicopter may use one of the t routes. Each route is also represented with a line on the map of the city. Dima is able to make a photo from an arbitrary point of the route, though the smaller distance from his location to the station means the better photo and the larger number of likes he is going to receive in social networks. That's why Dima needs your help.

You are given n descriptions of the subway lines and t lines defining the helicopter routes. For each of the helicopter routes Dima asks you to find the distance to the closest subway station.

It is guaranteed that no two subway lines coincide, any two subway lines have a common point, any two routes have a common point and each route has exactly one common point with each subway line.

Input

In the first line of the input there are two integers n, t ($2 \le n \le 100\,000$, $1 \le t \le 20$) — the number of subway lines and the number of helicopter routes, respectively.

In each of the following n lines there are three integers a_i, b_i and c_i ($|a_i|, |b_i| \le 10\,000$, $a_i^2 + b_i^2 > 0$, $|c_i| \le 10^8$) defining each of the subway lines. The corresponding line is defined by the equation $a_i \cdot x + b_i \cdot y + c_i = 0$.

In each of the following t lines there are three integers u_i, v_i, w_i ($|u_i|, |v_i| \le 10\,000$, $u_i^2 + v_i^2 > 0$, $|w_i| \le 10^8$) defining each of the helicopter routes. Similarly, each route is defined with the equation $u_i \cdot x + v_i \cdot y + w_i = 0$.

Output

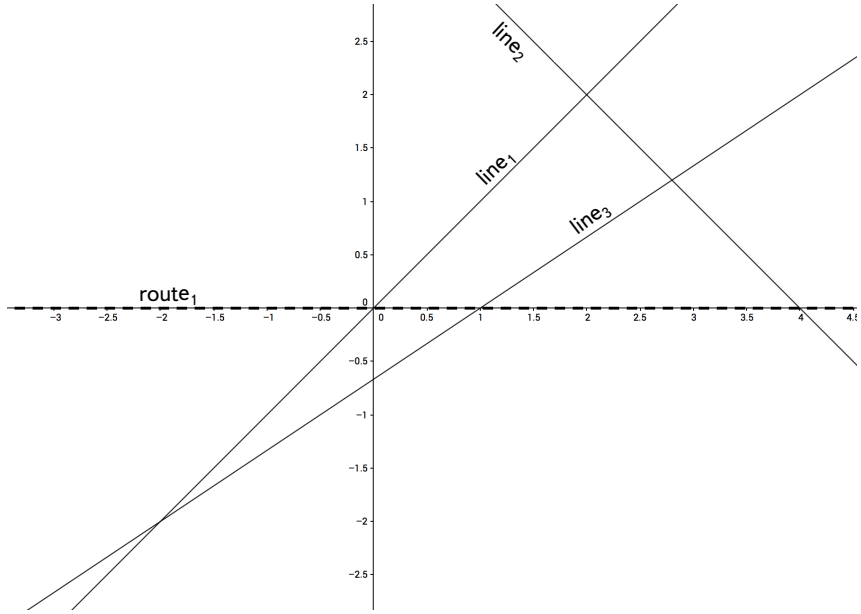
For each route output the only real number — the distance between i-th helicopter route and its most closest subway station. Your answer will be considered correct if the absolute or relative error between your answer and the answer of the jury doesn't exceed 10^{-9}. Namely, $\frac{|p-j|}{\max(1,j)} \le 10^{-9}$ where p is your answer and j is the answer of the jury.

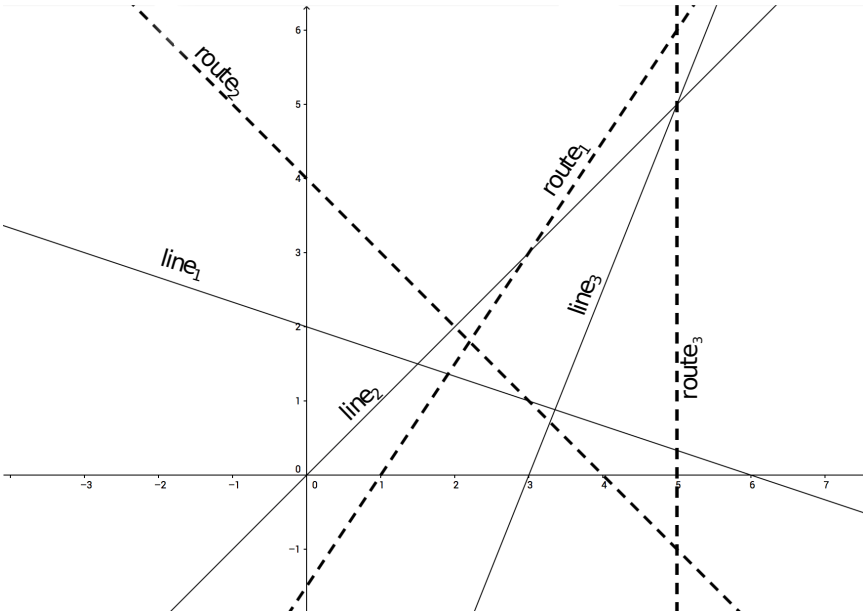
Examples

standard input	standard output
3 1 1 -1 0 1 1 -4 4 -6 -4 0 1 0	1.2
3 3 1 3 -6 -1 1 0 -5 2 15 3 -2 -3 -1 -1 4 1 0 -5	0.41602514717 0.16637806616 0.0

Note

The pictures for the samples are provided below.





Scoring

Tests for this problem are divided into five groups. For each group you earn points only if your solution passes all tests in this group and all tests in all **previous** groups except possibly the sample tests.

Group	Tests	Points	Constraints		Comment
			n	t	
0	1 – 2	0	–	–	Sample tests
1	3 – 19	10	$n \leq 1000$	$t = 1$	$u_i = 0$
2	20 – 34	20	$n \leq 1000$	$t = 1$	
3	35 – 55	30	$n \leq 40\,000$	$t = 1$	
4	–	40	$n \leq 100\,000$	$t \leq 20$	**Offline evaluation**