Gold Miner

Input file:	`standard input`
Output file:	`standard output`
Time limit:	4 seconds
Memory limit:	1024 megabytes

Putata has recently been obsessed with playing Gold Miner. The game is set on a two-dimensional plane where the map contains n gold nuggets, with the i-th nugget located at (x_i, y_i), where $y_i < 0$.

The player is positioned at a point $(p, 0)$ on the ground. Each level has a target k, representing the number of gold nuggets that must be collected to pass the level. Due to special geological properties, when the Euclidean distance between the player and a gold nugget is s, the force required to pull the nugget is $2 \cdot s$. The energy needed to collect a nugget is equal to the *work*† required to pull it to the player's position. Putata will use the optimal strategy to pass the level while minimizing the total energy consumption.

Now, Budada has designed q randomized levels. For the i-th level, the player's position p is a uniformly and randomly generated **real number** from the interval $[a_i, b_i]$, and the required number of gold nuggets is k_i. Your task is to help Putata compute, for each randomized level, the expected minimum total energy required to pass the level, modulo $10^9 + 7$.

It can be shown that the answer can be expressed as an irreducible fraction $\frac{x}{y}$, where x and y are integers and $y \not\equiv 0 \pmod{10^9 + 7}$. Output the integer equal to $x \cdot y^{-1} \pmod{10^9 + 7}$. In other words, output such an integer a that $0 \le a < 10^9 + 7$ and $a \cdot y \equiv x \pmod{10^9 + 7}$.

†: In science, *work* is the energy transferred to or from an object via the application of force along a displacement. When the force is variable, the *work* is given by the line integral: $W = \int \mathbf{F} \cdot ds$. The *work* of pulling a gold nugget at distance s equals $\int_0^s 2x \, dx = s^2$.

Input

The first line contains two integers n, q $(1 \le n \le 2000, 1 \le q \le 5 \cdot 10^5)$, denoting the number of gold nuggets and the number of levels.

The i-th of the following n lines contains two integers x_i, y_i $(0 \le x_i \le 10^9, -10^9 \le y_i < 0)$, denoting the coordinates of the i-th gold nugget.

The i-th of the following q lines contains three integers a_i, b_i, k_i $(0 \le a_i \le b_i \le 10^9, 1 \le k_i \le n)$, denoting a level.

Output

Output q lines, the i-th line contains the answer to the i-th level.

Examples

standard input	standard output
4 4 1 -2 4 -1 4 -3 5 -2 2 3 1 0 6 4 3 4 2 4 7 2	333333339 40 666666679 9
6 10 7 -5 2 -7 2 -7 5 -3 9 -4 5 -3 2 4 1 2 10 2 5 8 3 3 9 1 5 8 5 1 2 4 4 5 3 7 10 6 3 8 3 2 9 2	333333349 846354201 625000051 406250015 143 333333477 50 273 575000054 443452410

Note

For the first sample, the answers to the four queries are $\frac{10}{3}, 40, \frac{23}{3}, 9$.