

E. Triangles 3000

time limit per test: 5 seconds

memory limit per test: 512 megabytes

input: standard input

output: standard output

You are given a set $L = \{l_1, l_2, \dots, l_n\}$ of n pairwise non-parallel lines on the Euclidean plane. The i -th line is given by an equation in the form of $a_i x + b_i y = c_i$. L doesn't contain three lines coming through the same point.

A subset of three distinct lines is chosen equiprobably. Determine the expected value of the area of the triangle formed by the three lines.

Input

The first line of the input contains integer n ($3 \leq n \leq 3000$).

Each of the next lines contains three integers a_i, b_i, c_i ($-100 \leq a_i, b_i \leq 100, a_i^2 + b_i^2 > 0, -10\,000 \leq c_i \leq 10\,000$) — the coefficients defining the i -th line.

It is guaranteed that no two lines are parallel. Besides, any two lines intersect at angle at least 10^{-4} radians.

If we assume that I is a set of points of pairwise intersection of the lines (i. e.), then for any point it is true that the coordinates of a do not exceed 10^6 by their absolute values. Also, for any two distinct points the distance between a and b is no less than 10^{-5} .

Output

Print a single real number equal to the sought expected value. Your answer will be checked with the absolute or relative error 10^{-4} .

Examples

| input |
|-----------------------------------------|
| 4 1 0 0 0 1 0 1 1 2 -1 1 -1 |
| output |
| 1.25 |

Note

A sample from the statement is shown below. There are four triangles on the plane, their areas are 0.25, 0.5, 2, 2.25.