Triangles 3000

Input file:	`standard input`
Output file:	`standard output`
Time limit:	5 seconds
Memory limit:	512 megabytes

You are given a set $L = \{l_1, l_2, \ldots, l_n\}$ 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 ($3 \le n \le 3000$).

Each of the next lines contains three integers a_i, b_i, c_i ($-100 \le a_i, b_i \le 100$, $a_i^2 + b_i^2 > 0$, $-10\,000 \le c_i \le 10\,000$) — 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. $I = \{l_i \cap l_j \mid i < j\}$), then for any point $a \in I$ it is true that the coordinates of a do not exceed 10^6 by their absolute values. Also, for any two distinct points $a, b \in I$ the distance between a and b is no less than 10^{-5}.

Output

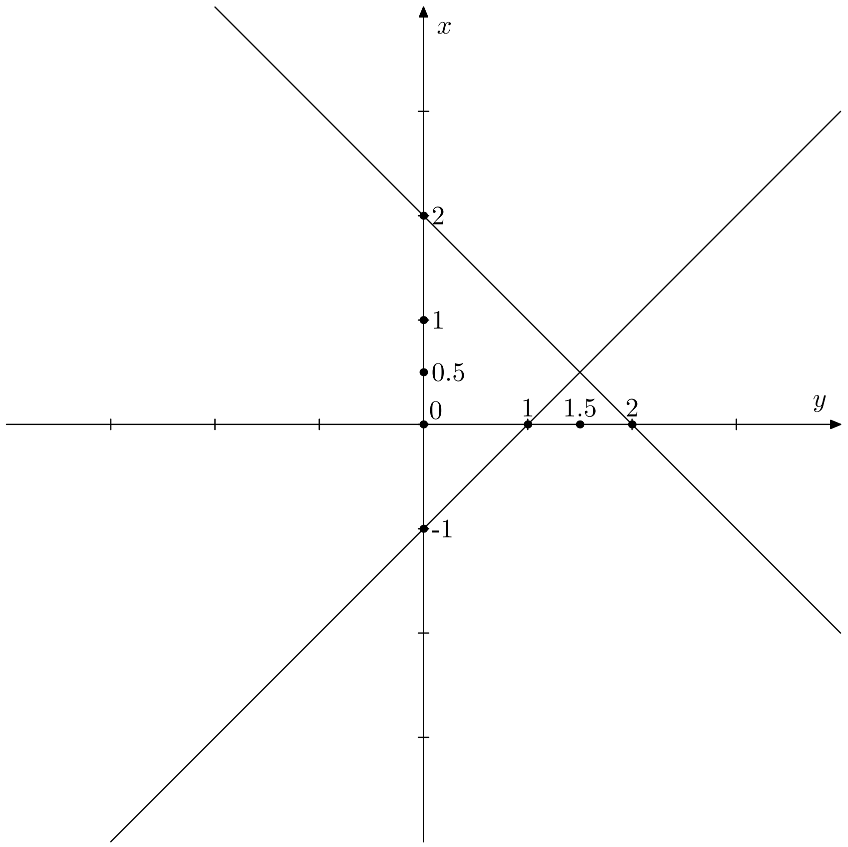
Print a single real number equal to the sought expected value. Your answer will be checked with the absolute or relative error 10^{-4}.

Examples

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

Note

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


x
2
1
0.5
0
1
1.5
2
y
-1