Green Energy

Description

Nowadays, "green" everything is the trend, so you may see many green problems in this season of ACM just like this. Green energy includes natural energetic processes that can be harnessed with little pollution. Green power is electricity generated from renewable energy sources.

Now we have n green power bases. The i-th power base located at position (x_i, y_i). If we turn on some of the power bases, they will provide A units of energy, where A is the area of the convex hull form by the activated power bases. What is the expected value of A if we turn on three distinct power bases uniform randomly?

Input

The first line contains an integer T indicating the total number of test cases. Each test case starts with one line containing a integer n. Then n lines with two integers x_i, y_i.

- $1 \leq T \leq 250$
- $3 \leq n \leq 2000$
- $-10^5 \leq x_i, y_i \leq 10^5$
- There are at most 5 test cases with $n > 100$.

Output

For each test case, please output a line with the expected value of A.

Sample Input

```
2
3
0 0
0 10
10 0
4
0 0
0 1
1 0
1 1
```

Sample Output

```
50.00000000000000
0.50000000000000
```