The Grand Tournament

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

Today, The First Grand Tournament of Automated Driving has officially commenced!

The experiment field of this tournament is a rectangular region on a 2-dimensional plane, with axes parallel to the coordinate axes. The bottom-left corner of the field is at coordinate (x_l, y_l) while the top-right corner is at coordinate (x_r, y_r). There are two segments A and B lying strictly inside the rectangle. The two segments may share common points. There is also a car inside the rectangle, which can be regarded as a point.

A subtask of this tournament requires that the distances between the car and the two segments must be equal all the time during the movement. The distance between a point P and a segment Q is defined as the minimum Euclidean distance from P to any point on Q.

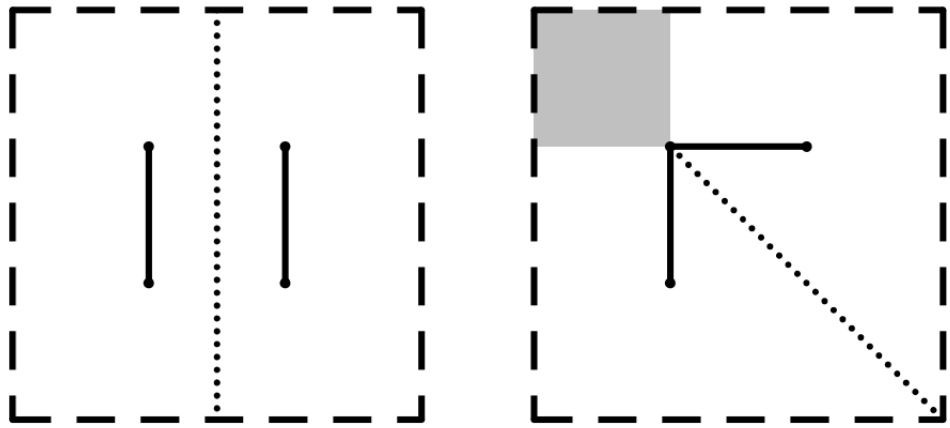

Рис. 1: Explanation of the sample data.

Please write a program to find the area of valid positions of the car.

Input

The input contains multiple cases. The first line of the input contains a single integer T ($1 \le T \le 10^5$), indicating the number of test cases.

For each case, the first line of the input contains four integers x_l, y_l, x_r, y_r ($-1\,000 \le x_l < x_r \le 1\,000$, $-1\,000 \le y_l < y_r \le 1\,000$), denoting the coordinates of the bottom-left and the top-right corners of the rectangle. Each of the next two lines contains four integers x_1, y_1, x_2, y_2, denoting a segment that connects (x_1, y_1) and (x_2, y_2), where $x_1, x_2 \in (x_l, x_r)$ and $y_1, y_2 \in (y_l, y_r)$.

For each case, it is guaranteed that the two endpoints of each segment do not coincide.

Output

For each test case, print a single line containing a single real number, the area of valid positions of the car. Your answer will be considered correct if the absolute or relative error does not exceed 10^{-9}.

Formally, if your answer is a and the jury's answer is b, then your answer will be considered correct if and only if $\frac{|a-b|}{\max\{1,|b|\}} \le 10^{-9}$.

Example

standard input	standard output
2 0 0 3 3 1 1 1 2 2 1 2 2 0 0 3 3 1 1 1 2 1 2 2 2	0.000000000000000 1.000000000000000