The 2009 ACM Asia Programming Contest Wuhan Site
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Problem J

Jiajia's Robot

Input: jiajia.in

Jiajia wants to do some experiments on his two-eyed robot. Each eye of the robot shoots a very thin laser beam from it, which goes infinitely (i.e. a mathematical "ray"). Restricted by the internal structure, the two laser beams from the eyes must always form a right angle (i.e. two rays must be perpendicular to each other).

To help the robot localize itself, Jiajia placed two linear-shaped special materials called MA and MB. If one of the rays intersects with MA, while the other ray intersects with MB, the robot is able to gather enough spatial information for the localization.

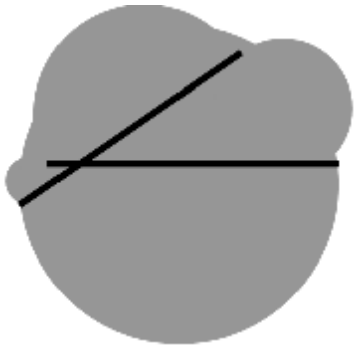


Fig. The collection of points from which the robot can localize itself.

The weird shape in the picture above is the collection of points from which the robot can localize itself. MA and MB are drawn as two line segments.

Though the task seems a little bit difficult, can you tell me the total area of these points?

Input

There will be at most 50 test cases. Each case contains a single line of 8 positive integers x_1, y_1, x_2, y_2, x_3, y_3, x_4, y_4 not greater than 500, where (x_1,y_1) and (x_2,y_2) are two endpoints of MA, (x_3,y_3) and (x_4,y_4) are two endpoints of MB. Note that MA and MB can have at most one common point. Neither MA nor MB will be degenerated to a point. The last test case is followed by 8 zeros, which should not be processed.

Output

For each test case, print the total area of "self-localizable point", to 3 digits after the decimal point. Print a blank line after the output of each test case.

Sample Input	Output for the Sample Input
264 280 147 360 162 335 320 334 203 165 288 227 149 295 153 344 0 0 0 0 0 0 0 0	Case 1: 26634.633 Case 2: 27436.383