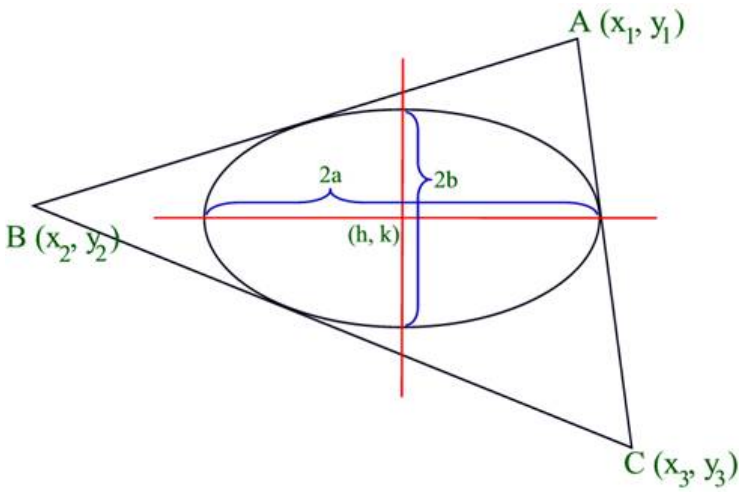
UVa Online Judge

11674 In-Ellipse

An in-ellipse of a triangle is an ellipse which touches all the sides of the triangle internally. In the figure below you can see a triangle ABC and one of its axis parallel in-ellipse.



Given the coordinate of vertices of a triangle, your job is to find that axis parallel in-ellipse. Note that any axis-parallel in-ellipse can be expressed uniquely with an equation of the following form:

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

Here (h, k) is the center of the ellipse (Intersection point of major and minor axis) and $2a$ is the length of the major axis and $2b$ is the length of the minor axis. So an axis-parallel ellipse can be uniquely described with four parameters h, k, a and b. For this problem b can be greater than a.

Input

The input file contains at most 10001 lines of inputs. Each line contains seven floating-point numbers x_1, y_1, x_2, y_2, x_3, y_3, El_A. The first six floating-point numbers denote that the three vertices of the triangle in counter-clockwise order are (x_1, y_1), (x_2, y_2) and (x_3, y_3). The seventh floating-point number El_A denotes the the area of in-ellipse of this triangle. Note that $(0 \leq x_1, y_1, x_2, y_2, x_3, y_3 \leq 5000)$ and $(0 < El\_A < 1000000)$. Input is terminated by a line where the given area of the in-ellipse is negative. This line should not be processed.

Output

For each line of input produce one line of output. This line contains four floating-point numbers. These numbers denote the value of h, k, a and b of the desired (Axis parallel in-ellipse of the given triangle and having area El_A) ellipse. All these floating-point numbers should have ten (10) digits after the decimal point. For every input there will be a solution. If there is more than one solution, any one will be accepted. There is an special judge to ignore small precision errors. Also the value of a/b should be within 0.1 and 10 to not allow ellipses that are almost straight line.

Sample Input

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97.6419300000 2129.1127667152 155.3286100000 1702.4002779560 385.0688800000 748.0494778467 1781.9759297640
138.7581800000 246.7354898358 352.2499900000 197.8134603618 54.2186200000 300.6027786815 423.6516437136
1727.1587740317 349.0465400000 479.4245277302 84.8220300000 1561.3000471558 179.7437900000 -44.3989182783
```

Sample Output

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165.0883167048 1730.5402621884 11.9500482151 47.4659637479
143.3157614522 257.5968732740 11.6210876787 11.6041209071
```