

# Circle vs Triangle

You are given a triangle and a circle in a plane. You can arbitrarily rotate or move them. What's the maximum possible area of their overlapping region?

## Input

Input consists of one or more lines. For each line, there are four integers describing one test case: the lengths of three sides of a triangle  $a, b, c$ ; and the radius of a circle  $r$ , where  $1 \leq a \leq b \leq c \leq 100, 1 \leq r \leq 100, a+b > c$ .

End of input is indicated by a line consisting four zeros.

## Output

For each test case, output a single line showing the largest overlapping area of the circle and the triangle. We accept solutions with absolute error less than  $10^{-2}$ .

## Example

**Input:**

```
3 4 5 1
5 5 8 4
0 0 0 0
```

**Output:**

```
3.14
12.00
```

**Judge is modified on Feb 23,2010. Now you can click on "Wrong Answer" for further information.**