

## Problem D

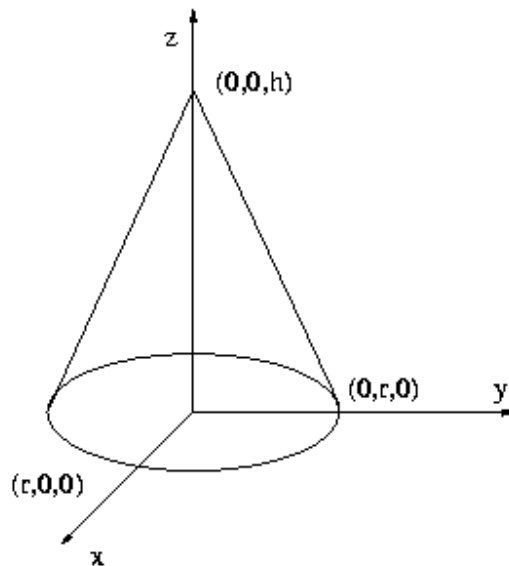
# Conic Distance

**Input:** standard input

**Output:** standard output

**Time Limit:** 2 seconds

A cone is located in 3D such that its base of radius  $r$  is in the  $z = 0$  plane with the center at  $(0,0,0)$ . The tip of the cone is located at  $(0, 0, h)$ . Two points are given on the cone surface in conic coordinates. The conic coordinates of a point  $p$  lying on the surface of the cone are two numbers: the first,  $d$ , is the distance from the tip of the cone to  $p$  and the second,  $A < 360$ , is the angle in degrees between the plane  $y = 0$  and the plane through points  $(0,0,0)$ ,  $(0,0,h)$  and  $p$ , measured counterclockwise from the direction of the  $x$  axis.



Given are two points  $p_1 = (d_1, A_1)$  and  $p_2 = (d_2, A_2)$  in the conic coordinates. What is the (shortest) distance between  $p_1$  and  $p_2$  measured on the surface of the cone?

The input is a sequence of lines. Each line contains 6 floating point numbers giving values of:  $r$ ,  $h$ ,  $d_1$ ,  $A_1$ ,  $d_2$ , and  $A_2$

For each line of input, output the (shortest) distance between points  $p_1$  and  $p_2$  on the surface of the cone with the fraction rounded to 2 decimal places.

## Sample Input

```
3.0 4.0 2.0 0.0 4.0 0.0
3.0 4.0 2.0 90.0 4.0 0.0
6.0 8.0 2.14 75.2 9.58 114.3
3.0 4.0 5.0 0.0 5.0 90.0
```

## Sample Output

2.00  
3.26  
7.66  
4.54

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