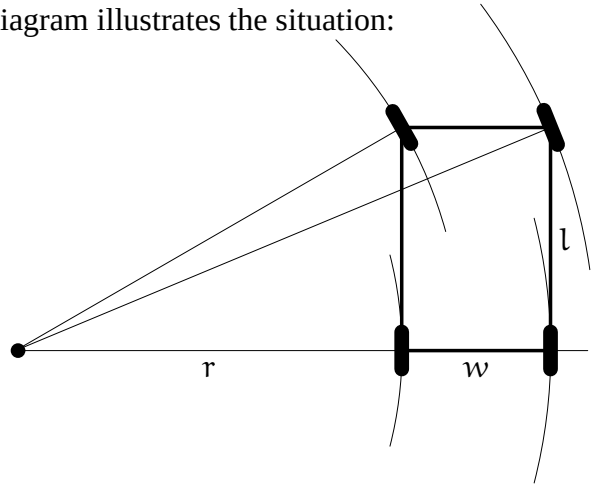
Turning Radius

Computer Science Society
Programming Contest
Winter 2008

A car with front-wheel steering turns by driving forward with the front wheels deflected some angle away from straight ahead. In order to smoothly turn all wheels about a single center point, the inside front wheel (closest to the center) and the outside front wheel (farthest from the center) are deflected at (slightly) different angles. In this problem, we will compute the rear inside wheel turning radius and front outside wheel angle, given the front inside wheel angle and the wheel base of the car. The following diagram illustrates the situation:



Input Format

Each line of input contains three real numbers $l > 0$, $w > 0$ and $0 < \theta_{in} \leqslant 90$ separated by one or more blanks, representing a turning car. l and w are the length and width (in feet) of the car's wheel base—the rectangle connecting the four points centered directly under each wheel, and θ_{in} is the angle (in degrees) that the inside front wheel is deflected away from straight ahead.

Output Format

For each line of input, compute and output the turning radius r (in feet) of the rear inside wheel and the angle θ_{out} (in degrees) that the outside front wheel is deflected away from straight ahead. Format the output as shown in the sample below, with numbers rounded to two decimal places.

Input Sample

```
10 5 45
17.32 10 60
5 5 90
16.5 11.2 10.1
```

Output Sample

```
 rear inside  turn radius: 10.00
front outside wheel angle: 33.69

 rear inside  turn radius: 10.00
front outside wheel angle: 40.89

 rear inside  turn radius: 0.00
front outside wheel angle: 45.00

 rear inside  turn radius: 92.63
front outside wheel angle: 9.03
```