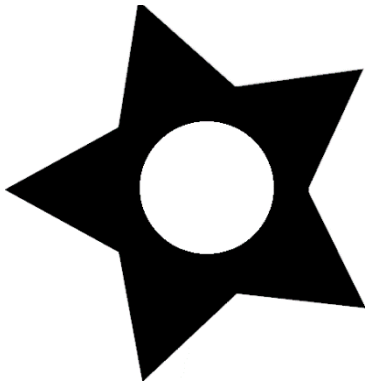
Shuriken

Filename: `shuriken`

A shuriken is a geometric shape that can be described as a combination of multiple shapes. The following are instructions to draw an *n*-sided shuriken:

- Draw a filled-in regular polygon with *n* sides of length *s*.
- Each of the polygon's sides is the base of a filled-in isosceles triangle of height *h*.
- Erase a circle of diameter *d* from the middle of the shuriken. The circle must be entirely within the regular polygon.



A diagram representing a 5-sided shuriken.

The area of the above shuriken corresponds to the area of the shape in black. To become a true ninja master, you must be able to calculate it. Use the value of $\pi = 3.14159265359$ in your calculations.

The Problem:

Compute the total area of a shuriken.

The Input:

The first line of the input file begins with a single, positive integer, *t*, representing the number of shurikens. For each shuriken, one line follows, each with four integers: $3 \leq n \leq 1000$, $1 \leq s, h, d \leq 1000$.

It is guaranteed that the shuriken is valid - the diameter is small enough for the circle to fit entirely inside the polygon.

The Output:

For each shuriken, output a single line saying "`Shuriken #i: c`" without the quotes, where `i` is the number of the shuriken, and `c` is the shuriken's area rounded to the nearest hundredth (1.234 rounds to 1.23 and 1.235 rounds to 1.24).

(Sample Input and Output are on the next page)

Sample Input:

```
2
4 4 2 2
5 6 3 2
```

Sample Output:

```
Shuriken #1: 28.86
Shuriken #2: 103.80
```