

# Problem G

## Truckin'

**Input:** Standard Input  
**Output:** Standard Output  
**Time Limit:** 8 Seconds

A truck driver has a regular route down a long stretch of highway. There are intersections with traffic lights at sections along this highway. He would like to plan his trip so that he does not spend any time waiting at red lights. He knows the period of each traffic light, so this is simple enough. However, fuel is costly, so he also wants to conserve fuel as much as possible. Help him determine the minimum amount of fuel required for the journey.

When driving at a constant speed of  $v$  meters per second, the rate of fuel consumption is assumed to be  $v + 1/v - 0.1$  milliliters per second.

Traffic lights stay red for a certain length of time, then turn green for a certain length of time, and repeat indefinitely. When the driver starts out, all lights are just starting their red cycle.

### Input

Every case begins with a line containing integers **D**, the distance to travel in meters, and **L**, the number of traffic lights along the route. The next **L** lines will each contain three positive integers **d**, **r**, and **g**. **d** is the distance along the route of this light, and **r** and **g** are the length in seconds of the red and green cycles, respectively.

No route will be longer than **10000** meters, and there will never be more than **50** traffic lights along a route. Complete light cycles always take between **30** and **90** seconds. Traffic lights will be specified in order of distance along the route (and will not overlap each other or the beginning and end of the route).

Input will be terminated with a line containing two 0s. There will be at most **15** test cases.

### Output

For each case, output one line consisting of the minimum fuel required (in milliliters) to make the journey as described, accurate to two decimal places.

### Sample Input

```
1000 3
250 20 20
500 40 40
750 19 19
0 0
```

### Output for Sample Input

```
998.03
```

---

**Problem setter: Derek Kisman, Member of Elite Problemsetters' Panel**