

10th South African Regional ACM Collegiate Programming Contest

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Problem D - Green Balloon Resistor

Problem Description

Professor Instein is a well renowned physicist. One day while doing an experiment he was looking for a $42\ \Omega$ resistor. After frantically searching his office he realised that he does not have such a resistor. What he did discover though was lots of other resistors which had a smaller or bigger resistance.

So he decided to use some of these resistors to build a resistor that has a resistance as close as possible to the one he wants. Remember that if you put resistors with resistance R_1, \dots, R_n in series you get a resistor with resistance R where

$$R = R_1 + \dots + R_n.$$

And if you put resistors with resistance R_1, \dots, R_n in parallel you get a resistor with resistance R where

$$1/R = 1/R_1 + \dots + 1/R_n.$$

Task

Your task is to help Professor Instein by making use of the resistors he found in his office to make a resistor with resistance as close as possible to the value G he wants.

Example

If $G = 42$ and he found $6\ \Omega, 6\ \Omega, 6\ \Omega$, and $40\ \Omega$ resistors he can build such a resistor by putting all the $6\ \Omega$ resistors in parallel and then in series with the $40\ \Omega$ resistor.

Input

The first line of the input contains an integer T which is the number of test cases. The first line in each of the T blocks is two space-separated integers G and N . The next line contains N integers which is the resistance of the N resistors he discovered.

The constraints placed on G and N are:

- $1 \leq G \leq 100$
- $1 \leq N \leq 7$

Output

For each test case print out to three decimal places the smallest possible value of $|G - R|$ on a single line for all resistors R he can make with the resistors in his office.

Sample Input

```
3
7 3
3 5 5
9 4
10 13 14 7
10 2
7 3
```

Sample Output

```
0.125
0.159
0.000
```

Time Limit

60 seconds