# Problem 6370 - Bode Plot  Multilingual
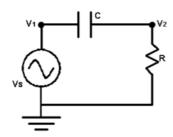
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| Time Limit | Memory Limit | Submissions | Accepted | Solved | Ratio |
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## Description

Consider the AC circuit below. We will assume that the circuit is in steady-state. Thus, the voltage at nodes 1 and 2 are given by $v_1 = V_S \cos \omega t$ and $v_2 = V_R \cos (\omega t + \theta)$ where VS is the voltage of the source, $\omega$ is the frequency (in radians per second), and t is time. $V_R$ is the magnitude of the voltage drop across the resistor, and $\theta$ is its phase.



You are to write a program to determine $V_R$ for different values of $\omega$. You will need two laws of electricity to solve this problem. The first is Ohm's Law, which states $v_2 = i R$ where i is the current in the circuit, oriented clockwise. The second is $i = C \, d/dt \, (v_1 - v_2)$ which relates the current to the voltage on either side of the capacitor. "d/dt" indicates the derivative with respect to t.

## Input

The input will consist of one or more lines. The first line contains three real numbers and a non-negative integer. The real numbers are $V_S$, R, and C, in that order. The integer, n, is the number of test cases. The following n lines of the input will have one real number per line. Each of these numbers is the angular frequency, $\omega$.

## Output

For each angular frequency in the input you are to output its corresponding $V_R$ on a single line. Each $V_R$ value output should be rounded to three digits after the decimal point.

## Sample Input 1  Copy

```
1.0 1.0 1.0 9
0.01
0.031623
0.1
0.31623
1.0
3.1623
10.0
31.623
100.0
```

## Sample Output 1  Copy

```
0.010
0.032
0.100
0.302
0.707
0.953
0.995
1.000
1.000
```

## Source

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보기

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