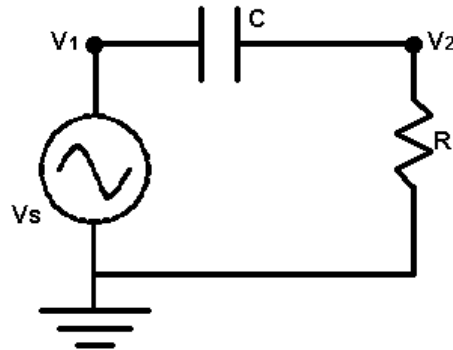




D • Bode Plot

Problem

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 V_S is the voltage of the source, ω is the frequency (in radians per second), and t is time. V_R is the magnitude of the voltage drop across the resistor, and θ is its phase.



You are to write a program to determine V_R for different values of ω . 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 .

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, ω .

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.

Example

Input	Output
1.0 1.0 1.0 9	0.010
0.01	0.032
0.031623	0.100
0.1	0.302
0.31623	0.707
1.0	0.953
3.1623	0.995
10.0	1.000
31.623	1.000
100.0	