Problem M. Malus' Law

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	1024 mebibytes

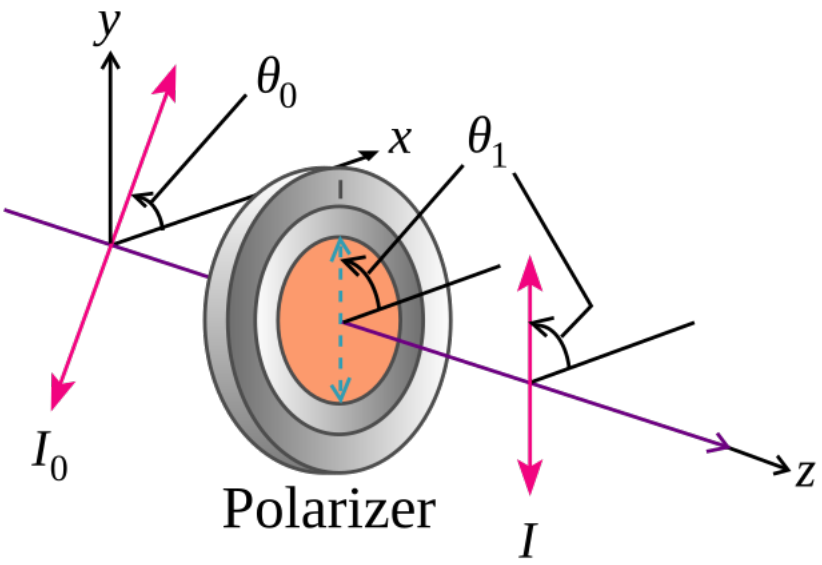
A long time ago, when Dr. Tseng was not yet renowned as a physicist, he had once won a gold medal in the *Olympiades internationales d'optique (OIO)*. As a reward, he received a set of polarizers.

When polarized light passes through a polarizer, the change in intensity can be calculated using the following formula:

$$I = I_0 \cos^2(|\theta_0 - \theta_1|),$$

where

- I is the intensity of light after passing through the polarizer,
- I_0 is the initial intensity of light before the polarizer,
- θ_0 is the light's initial polarization direction, and
- θ_1 is the transmission axis of the polarizer, and also the light's polarization direction after passing through the polarizer.



Malus' Law (Wikipedia)

If $\theta_0 = 0°$ and $\theta_1 = 90°$, the light is completely blocked. However, Tseng soon discovered that, after the insertion of another polarizer at 45° between the light source and the first polarizer, the intensity became

$$I = I_0 \cos^2(|0° - 45°|) \cos^2(|45° - 90°|) = \frac{1}{4} I_0.$$

Now, Tseng has a light source that emits polarized light with initial polarization direction φ. He also has N polarizers with transmission axes $\theta_1, \theta_2, \ldots, \theta_N$. Assume the initial intensity of light is 1.0. What could be the maximum intensity of light after it passes through **all** polarizers if Tseng arranges them in the best possible order?

Input

The first line contains a single integer T, the number of test cases ($1 \le T \le 10^5$).

The first line of each test case contains two integers, N and φ: the number of polarizers and the light's initial polarization direction in degrees ($1 \le N \le 10^5$; $0 \le \varphi < 360$).

The second line of each test case contains N integers $\theta_1, \theta_2, \ldots, \theta_N$: the transmission axes of the polarizers in degrees ($0 \le \theta_i < 360$).

The sum of N across all test cases does not exceed 10^5.

Output

Print the maximum possible intensity after the light passes through all polarizers.

Your answer will be accepted if the absolute or relative error does not exceed 10^{-6}. Formally, let your answer be a, and the jury's answer be b. Your answer is considered correct if $\frac{|a-b|}{\max(1,|b|)} \le 10^{-6}$.

Examples

standard input	*standard output*
3 1 0 90 2 0 45 90 5 0 1 2 3 4 5	0.00000000000000 0.25000000000000 0.99847799499451
2 5 180 0 60 120 240 300 4 333 239 100 41 5	0.06250000000000 0.24250943127818