

Mosty! Find Gn

Omar want to examine Mostafa in math , Mostafa asked to give G(n) that defined as :

$$G(n) = \sqrt{F(n) - \frac{(n-1)^2}{n^2} F_{(n-1)} + \frac{1}{n^2}}$$

while :

$$G(n) = \sqrt{F(n) - \frac{(n-1)^2}{n^2} F_{(n-1)} + \frac{1}{n^2}}$$

Mostafa need your help to find G(n) (n : givin integer)

assume that : F(1) = 8 , F(2) = 8;

Input

T number of test cases in the first line , T line follow with an integer n .

Output

Print G(n) for each test case with 8 decimal digits after the point (0 < G(n) < 3)

Example

Input:

3
5
7
42

Output:

2.20000000
2.14285714
2.02380952

T < 10⁴
2 < n < 10⁹