557 Burger

When Mr. and Mrs. Clinton's twin sons Ben and Bill had their tenth birthday, the party was held at the McDonald's restaurant at South Broadway 202, New York. There were 20 kids at the party, including Ben and Bill. Ronald McDonald had made 10 hamburgers and 10 cheeseburgers and when he served the kids he started with the girl directly sitting left of Bill. Ben was sitting to the right of Bill. Ronald flipped a (fair) coin to decide if the girl should have a hamburger or a cheeseburger, head for hamburger, tail for cheeseburger. He repeated this procedure with all the other 17 kids before serving Ben and Bill last. Though, when coming to Ben he didn't have to flip the coin anymore because there were no cheeseburgers left, only 2 hamburgers.

Ronald McDonald was quite surprised this happened, so he would like to know what the probability is of this kind of events. Calculate the probability that Ben and Bill will get the same type of burger using the procedure described above. Ronald McDonald always grills the same number of hamburgers and cheeseburgers.

Input

The first line of the input-file contains the number of problems n , followed by n times:

a line with an even number [2,4,6,...,1000], which indicates the number of guests present at the party including Ben and Bill.

Output

The output consists of n lines with on each line the probability (4 decimals precise) that Ben and Bill get the same type of burger.

Note: a variance of ± 0.0001 is allowed in the output due to rounding differences.

Sample Input

```
3
6
10
256
```

Sample Output

```
0.6250
0.7266
0.9500
```