Project Euler #129: Repunit divisibility

A number consisting entirely of ones is called a repunit. We shall define $R(k)$ to be a repunit of length k; for example, $R(6) = 111111$.

Given that n is a positive integer and $\text{gcd}(n, 10) = 1$, it can be shown that there always exists a value, k, for which $R(k)$ is divisible by n, and let $A(n)$ be the least such value of k; for example, $A(7) = 6$ and $A(41) = 5$.

The least value of n for which $A(n)$ first exceeds ten is 17.

Given n, compute $A(n)$.

Input Format

The first line of input contains T, the number of test cases.

Each test case consists of a single line containing single integer, n.

Constraints

$\text{gcd}(n,10) = 1$

Test files #1-2:
$1 \le T \le 20000$
$1 \le n \le 10^6$

Test files #3-6:
$1 \le T \le 100$
$1 \le n \le 10^{13}$

Output Format

For each test case, output a single line containing a single integer, $A(n)$.

Sample Input

```
2
7
41
```

Sample Output

```
6
5
```

Explanation

As mentioned in the problem statement, $A(7) = 6$ and $A(41) = 5$.