

# Project Euler #129: Repunit divisibility

This problem is a programming version of [Problem 129](#) from [projecteuler.net](#)

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:*

$$1 \leq T \leq 20000$$

$$1 \leq n \leq 10^6$$

*Test files #3-6:*

$$1 \leq T \leq 100$$

$$1 \leq n \leq 10^{13}$$

## 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  $A(41) = 5$ .