Another Mathematical Problem

Given two numbers n ($1<=n<10^{100}$) and k ($1<=k<=100$), you are to determine whether there exists a positive integer T which satisfies that for every positive integer a, $n^{a+T}-n^a$ is divisible by 10^k.

Input

Multiple test cases. Each test case contains two space-separated integers n and k. Input terminate by EOF.

The number of test cases will not more than 20.

Output

For each test case, you should output the smallest positive integer number T which satisfies the condition above, or -1 if it doesn't exist.

Example

Input:
32 2

Output:
4