Another Mathematical Problem

Given two numbers n (1<=n<10¹⁰⁰) 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