

# Fading Wind

Problem ID: fadingwind

Time limit: 1 second

You're competing in an outdoor paper airplane flying contest, and you want to predict how far your paper airplane will fly. Your design has a fixed factor  $k$ , such that if the airplane's velocity is at least  $k$ , it will rise. If its velocity is less than  $k$  it will descend.

Here is how your paper airplane will fly:

- You start by throwing your paper airplane with a horizontal velocity of  $v$  at a height of  $h$ . There is an external wind blowing with a strength of  $s$ .
- While  $h > 0$ , repeat the following sequence:
  - Increase  $v$  by  $s$ . Then, decrease  $v$  by  $\max(1, \lfloor \frac{v}{10} \rfloor)$ . Note that  $\lfloor \frac{v}{10} \rfloor$  is the value of  $\frac{v}{10}$ , rounded down to the nearest integer if it is not an integer.
  - If  $v \geq k$ , increase  $h$  by one.
  - If  $0 < v < k$ , decrease  $h$  by one. If  $h$  is zero after the decrease, set  $v$  to zero.
  - If  $v \leq 0$ , set  $h$  to zero and  $v$  to zero.
  - Your airplane now travels horizontally by  $v$  units.
  - If  $s > 0$ , decrease it by 1.

Compute how far the paper airplane travels horizontally.

## Input

The single line of input contains four integers  $h, k, v$ , and  $s$  ( $1 \leq h, k, v, s \leq 10^3$ ), where  $h$  is your starting height,  $k$  is your fixed factor,  $v$  is your starting velocity, and  $s$  is the strength of the wind.

## Output

Output a single integer, which is the distance your airplane travels horizontally. It can be shown that this distance is always an integer.

Sample Input 1	Sample Output 1
1 1 1 1	1
Sample Input 2	Sample Output 2
2 2 2 2	9
Sample Input 3	Sample Output 3
1 2 3 4	68
Sample Input 4	Sample Output 4
314 159 265 358	581062