Magical Cakes

Problem Statement:
Bessie the cow has found a field of C magical cakes! The cakes are randomly distributed with a random original width C_w at the position C_i on a positive 1 dimensional number line, where C_i represents the left coordinate of the cake (inclusive) and $C_i + C_w$ represents the right coordinate of the cake (exclusive) . Bessie has also been learning to sing recently, but she's very shy about her singing voice. Each time she sings, the magical cakes, being magical cakes, grow towards positive x by a factor of their original width.

In other words, each cake starts with a width C_w at point C_i. If Bessie sings once, then each cake now has width $2 * C_w$ starting at point C_i. If Bessie sings twice, then each cake has width $3 * C_w$. If Bessie sings n times, then each cake has width $(n-1) * C_w$.

Bessie wants the total lengths of all the cakes to be at least N, but when a magical cake grows on top of another magical cake and they overlap, that is only treated as one cake segment, not two. However, Bessie doesn't like to sing. How many times does Bessie need to sing to ensure there is enough cake?

Input Format:
Line 1: C, N
Line 2..C+1: 2 numbers, C_i and C_w respectively, separated by spaces.

Example Input:
4 30
1 3
7 1
17 3
24 4

Flag Format:
mctf{m49iCa1_cAk3s_[ANSWER]}
[ANSWER]: an integer representing the minimum number of times Bessie needs to sing

Example Flag:
mctf{m49iCa1_cAk3s_3}

Answer Explanation:
In the following example, each of the cakes are labeled 1, 2, 3, and 4. A cake is denoted in the example with its label on its starting position, and with @ symbols to represent the spaces that the cake takes up.

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01234567890123456789012345678901234567890123456789012345678901234567890
_1@@___2_________3@@____4@@@_____________________________________
0 Songs, total cakes = 11

_1@@@@@2@________3@@@@@_4@@@@@@@_____________________________________
1 Songs, total cakes = 22

_1@@@@@2@@_______3@@@@@@4@@@@@@@@@@@_____________________________
2 Songs, total cakes = 28

_1@@@@@2@@@@@____3@@@@@@4@@@@@@@@@@@@@@@_________________________
3 Songs, total cakes = 35
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Take note that cake 1 eventually overlaps with cake 2 and cake 3 overlaps with cake 4. However, while cake 1 eventually outspeeds cake 2 and overtakes it, cake 3 is overshadowed by cake 4 as it grows slower.