

You are taking care of Emily this afternoon. To keep her entertained, you've designed a game for her involving some math. The rule for the game is such — Emily is initially given a big number  $N$ . In each step she is supposed to:

1. If  $N$  is 0, stop and call it a day
2. If  $N$  is divisible by 2, divide  $N$  by 2.
3. Otherwise, subtract 1 from  $N$ .

For example, starting with 14, she gets 7, 6, 3, 2, 1, 0

Now, you see, Emily is just a kid and hasn't grown strong notions of rules yet. So, as you have given the rules to her, Emily tries, but misunderstands. In her mind, she rewrites the rules :

1. If  $N$  is 0, stop and call it a day
2. If  $N$  is divisible by 2, divide  $N$  by 2.
3. Randomly and unbiasedly choose to do any of these two :
  - subtract 1 from  $N$
  - add 1 with  $N$

For each division Emily takes  $d$  seconds, For each subtraction she takes  $s$  seconds, for each addition she takes  $a$  seconds. Now that you know how she is bending the rules, you start to wonder how many seconds you have to see Emily play.

## Input

First line of input will contain the number of test cases,  $T \leq 100000$ . Then  $T$  test cases follow. For each case there will be a single line containing four integers separated by space:

$N d s a$

where ,

- $1 \leq N \leq 1000000$
- $1 \leq d, s, a \leq 10$

## Output

For each case output a single line containing one real number, the expected number of seconds:  $T$ . Show exactly 3 digits after decimal point, properly rounded.

## Sample Input

```
6
1 1 1 1
2 1 1 1
3 1 1 1
4 1 1 1
5 1 1 1
1000000 1 1 1
```

## Sample Output

```
3.000
4.000
5.500
5.000
6.750
29.367
```