Some mathematical background. This problem asks you to compute the expected value of a random variable. If you haven't seen those before, the simple definitions are as follows. A *random variable* is a variable that can have one of several values, each with a certain probability. The probabilities of each possible value are positive and add up to one. The *expected value* of a random variable is simply the sum of all its possible values, each multiplied by the corresponding probability. (There are some more complicated, more general definitions, but you won't need them now.) For example, the value of a fair, 6-sided die is a random variable that has 6 possible values (from 1 to 6), each with a probability of 1/6. Its expected value is $1/6 + 2/6 + \ldots + 6/6 = 3.5$. Now the problem.

I like to play solitaire. Each time I play a game, I have probability p of solving it and probability $(1 - p)$ of failing. The game keeps statistics of all my games – what percentage of games I have won. If I simply keep playing for a long time, this percentage will always hover somewhere around $p * 100\%$. But I want more.

Here is my plan. Every day, I will play a game of solitaire. If I win, I'll go to sleep happy until the next day. If I lose, I'll keep playing until the fraction of games I have won today becomes larger than p. At this point, I'll declare victory and go to sleep. As you can see, at the end of each day, I'm guaranteed to always keep my statistics above the expected $p * 100\%$. I will have beaten mathematics!

If your intuition is telling you that something here must break, then you are right. I can't keep doing this forever because there is a limit on the number of games I can play in one day. Let's say that I can play at most n games in one day. How many days can I *expect* to be able to continue with my clever plan before it fails? Note that the answer is always at least 1 because it takes me a whole day of playing to reach a failure.

Input

The first line of input gives the number of cases, N. N test cases follow. Each one is a line containing p (as a fraction) and n.

$1 \leq N \leq 3000$, $0 \leq p < 1$,

The denominator of p will be at most 1000,

$1 \leq n \leq 100$.

Output

For each test case, print a line of the form '`Case #`x`:` y', where y is the expected number of days, rounded down to the nearest integer. The answer will always be at most 1000 and will never be within 0.001 of a round-off error case.

Sample Input

```
4
1/2 1
1/2 2
0/1 10
1/2 3
```

Sample Output

```
Case #1: 2
Case #2: 2
Case #3: 1
Case #4: 2
```