

7144 Game

Sergey and Eric are playing a game. At the beginning of the game, each of them has an hit point H , power P and defense ratio D . The game is playing round by round. In each round, both Sergey and Eric attack each other simultaneously. After the attack, each of their hitpoint deducted by $\lceil P_{enemy}/D_{self} \rceil$ ($\lceil x \rceil$ is the smallest integer not less than x)

Each of them has a skill: they can switch their own current power and hitpoint. Before each round begins, they can choose to use this skill or not. They can use this skill as many times as they want. But they will not know whether the other uses this skill or not until the attack begins.

If anyone's hitpoint drops to or below zero, he dies immediately and he could not switch his power and hitpoint anymore and the game ends. If only one of them dies, the other one wins. If both of them dies, the game ties.

The winner will get 100 points and the loser will get -100 points. If the game ties, both of them get 0 point.

Both of them want to get as much points as possible. If both of them play optimally, what's the expected points Sergey can get?

Input

The first line of the input gives the number of test cases, T . T test cases follow. Each test case has only one line with 6 integers, H_{Sergey} , P_{Sergey} , D_{Sergey} , H_{Eric} , P_{Eric} , D_{Eric} .

Output

For each test case, output one line containing 'Case # x : y ', where x is the test case number (starting from 1) and y is expected points Sergey can get if both of them play optimally.

y will be considered correct if it is within an absolute or relative error of 10^{-6} of the collect answer.

Limits:

$1 \leq T \leq 100$.

$1 \leq H_{Sergey}, P_{Sergey}, D_{Sergey}, H_{Eric}, P_{Eric}, D_{Eric} \leq 50$

Sample Input

```
3
1 1 1 1 1 1
5 1 1 1 1 1
4 1 2 3 2 2
```

Sample Output

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Case #1: 0.0
Case #2: 100.0
Case #3: -50.0
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