Mahjong Madness

Problem ID: mahjongmadness

Mahjong is an ancient game similar to poker, where players build hands of tiles to win. You are playing a very simple version of the game, where there is only one player and one "suit" of tiles. Tiles can be numbered from $1-9$, and there are a total of 4 of each numbered tile, resulting in a total of 36 tiles.

You win the game once you complete a hand, which consists of 14 tiles in total: 4 "sets" of tiles and a "pair" of tiles. A "pair" of tiles is any pair of the same numbered tile, and a "set" of tiles can be either 3 of the same numbered tile, or a 3-length straight of numbered tiles ($1-2-3$ or $6-7-8$). If a tile is counted in a "set" or "pair", it cannot be counted again in any other "set" or "pair". No set can wrap around ($8-9-1$ is not a valid set).

In addition, different completed hands have different scores. At the start of each game, you will be given a number x such that all tiles numbered x will be worth more points. In this game, a completed hand is worth 1 point, and each tile numbered x in your completed hand is worth 1 additional point. An incomplete hand is worth 0 points.

In this version of the game, you are given a starting hand of 14 tiles out of the total 36 tiles, and you are given one turn where you must discard a tile from your hand and draw a new tile from the remaining unused tiles. Given a starting hand and the extra point tile, find the maximal expected point value after drawing and discarding a single tile.

Also note that you must discard a tile even if you are dealt a winning starting hand.

In the first sample input, you would output 0.863636, since if you discard the 1, you complete your hand if you draw any tile other than 1. This means that out of the 22 tiles remaining, there are 19 tiles that can complete the hand, and the resulting hand will be worth 1 point, so the expected point value after discarding the 1 would be $\frac{19}{22} = 0.863636$. An example of the hand that can be formed after discarding a 1 and picking up a 9 would be $3-3-3,\ \ 4-5-6,\ \ 7-8-9,\ \ 9-9-9,\ \ 8-8$. On the other hand, if you discard the 4 or 7 tile instead and wait for the 1, your expected value is lower: $\frac{3}{22} * 3 = 0.409091$.

Input

The first line of input contains a single integer x that represents the extra point tile. ($1 \leq x \leq 9$)

The second line of input contains 14 space-separated integers n_i representing the tiles in your starting hand. ($1 \leq n_i \leq 9$)

Output

Output one line containing a single real value representing the maximal expected point value of your starting hand. Your answer will be considered correct if it is within an absolute or relative error of 10^{-6}

Sample Input 1

```
1
1 3 3 3 4 5 6 7 8 8 8 9 9 9
```

Sample Output 1

```
0.863636
```

Sample Input 2

```
3
1 3 3 3 4 5 6 7 8 8 8 9 9 9
```

Sample Output 2

```
3.500000
```

Sample Input 3

```
1
1 1 2 2 4 4 6 6 7 7 8 8 9 9
```

Sample Output 3

```
0.000000
```