It is perhaps easier to consider the cards as being in a fixed order and the counting to be a randomization of the given sequence (18 ones, 17 twos, 17 threes).

The number of sequences is $\frac{52!}{18!17!17!} = 99,579,591,790,845,629,463,000.$

Suppose that i ones, j twos and k threes are in specified positions with the same labels (forbidden positions).

The number of such sequences is $P(i,j,k) = \binom{4}{i}\binom{4}{j}\binom{4}{k}\frac{(52-i-j-k)!}{(18-i)!(17-j)!(17-k)!}$.

By the principle of inclusion-exclusion, the number of winning sequences is

$$\begin{aligned} & \sum_{i=0}^{4}\sum_{j=0}^{4}\sum_{k=0}^{4}\binom{4}{i}\binom{4}{j}\binom{4}{k}\frac{(52-i-j-k)!}{(18-i)!\,(17-j)!\,(17-k)!}(-1)^{i+j+k} \\ = \;& 813,069,712,393,655,972,160, \end{aligned}$$

and the probability of winning is

$$\begin{aligned} & \left(\frac{52!}{18!17!17!}\right)^{-1}\sum_{i=0}^{4}\sum_{j=0}^{4}\sum_{k=0}^{4}\binom{4}{i}\binom{4}{j}\binom{4}{k}\frac{(52-i-j-k)!}{(18-i)!\,(17-j)!\,(17-k)!}(-1)^{i+j+k} \\ = \;& \frac{24,532,967,512}{3,004,641,364,725} \approx 0.008165 \end{aligned}$$