# Maverick's Solitaire

(Source: Television episode of "Maverick" with James Garner)

RULES OF THE GAME:

Randomly select 25 cards from a deck....

GOAL: Arrange the 25 cards into groups of five, forming exactly 5 'pat' hands...

(Pat hands are 'made hands' that don't need an exchange card(s)...
EX: Straights, flushes, full house, 4 of a kind... 3 of a kind is NOT a pat hand.)

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Math problems and topics of discussion:

1) What is the total number of possible 5 card hands?

2) What are the odds of being dealt a straight flush? (5 card draw poker)

3) What are the odds of being dealt <u>any</u> 'pat hand'?

***4) So, if the odds of being dealt a pat hand are so small, why is being dealt 5 pat hands very common!?!?!

HINTS AND SOLUTIONS:

1) 5 cards <u>in Order</u>: the answer would be 52 x 51 x 50 x 49 x 48… **But**, since the 5 card hands don't have to be in order (example: 4 6 8 Jack King of clubs is the same as 8 6 4 King Jack of clubs), the answer is (52 x 51 x 50 x 49 x 48)/ (5 x 4 x 3 x 2 x1)

(note: if you take each 5 card hand and rearrange it, you get 5 x 4 x 3 x 2 x 1 possibilities. Therefore, dividing by 120 eliminates the 'double counting' of possibilities)

2) Possible hands in draw poker

52*51*50*49*48/5*4*3*2*1

or 52!/47!*5!

Anyway, that's 2,598,960 possible hands you could be dealt

It's pretty easy to figure the # of straight flushes to be 40 (there are 10 for each suit)

A2345, 23456, 34567, ..... 910JQK , 10JQKA (times the 4 suits)

So the answer you are looking for is

40/2,598,960 which is

0.0000154 or 0.00154% chance of being DEALT a straight flush/royal flush

3) The following table lists the name of each different possible hand in order of their rank. It also lists the possible number of ways each can be made and the chances of being dealt such a hand in the first five cards dealt. An example would be the original five cards dealt in Five-Card Draw Poker before you draw.

| **Rank of Hands** | **Number of Possible Ways Hand can be Made** | **Chance of Being Dealt in Original 5 Cards** |
|---|---|---|
| Royal Flush | 4 | 1 in 649,740.00 |
| Straight Flush | 36 | 1 in 72,193.33 |
| Four of a Kind | 624 | 1 in 4,165.00 |
| Full House | 3,744 | 1 in 694.16 |
| Flush | 5,108 | 1 in 508.80 |
| Straight | 10,200 | 1 in 254.80 |

| Rank of Hands | Number of Possible Ways Hand can be Made | Chance of Being Dealt in Original 5 Cards |
|---|---|---|
| Three of a Kind | 54,912 | 1 in 47.32 |
| Two Pairs | 123,552 | 1 in 21.03 |
| One Pair | 1,098,240 | 1 in 2.36 |
| No Pair Hand | 1,302,504 | 1 in 1.99 |
| | | |
| TOTAL | 2,598,960 | |

(source: http://www.pokerpages.com/school/node/716)

(***Note: The chart doesn't "Double Count".. Example: 6-7-8-9-10 of hearts is not included as a flush or a straight flush. Therefore, the total 'pat' hands can be determined by adding the hands together.)

19,716 total 'pat' hands… The odds of being dealt a pat hand: 19716/2598960= .00758

or approx. .7% (or, approx. 1 out of 130 times)

4) Consider the difference between being <u>dealt</u> 5 pat hands versus being dealt 25 cards and <u>rearranging the order</u>

Maverick's Solitaire test:

(Sample test conducted on 9-8-2010)

Practice example: (jokers were removed)

25 cards picked (in order)

| | | | | | |
|---|---|---|---|---|---|
| 4D | 8D | 7H | JS | AC | Pat hand? No |
| 9H | QH | QC | KD | 5C | Pat hand? No (pair of queens is not good enough) |
| QS | 4C | 2S | 6D | 4H | Pat hand? No |
| 8H | JD | 6C | QD | 5H | Pat hand? No |
| KC | 5D | 10D | 3C | AH | Pat hand? No |

Well, none of the 5 initial hands are good enough.... That's not surprising, because the odds of being dealt a pat hand are 1:130

So, how many pat hands can we make by **rearranging** the 25 cards? ("Maverick's Solitaire")

Approach: first, I organized the cards into piles based on suit...

Hearts: A 4 5 7 8 9 Q

Clubs: A 3 4 5 6 Q K

Spades: 2 J Q

Diamonds: 4 5 6 8 10 J Q K

We have 3 stray spades, so let's put them with the others...

Try batching....

2spades with 3C 4D 5H....

Jspades with Jdiamonds

Qspades with QC QD QH (4 queens is a useful group, because we can add any card and still have a pat hand)

Now examine the piles:

One of the Jacks can join the 4 Queens... (4 Queens is a pat hand)... We place the J of spades with the 4 queens (because we assume the Jack of Diamonds can be grouped with 4 diamonds for a flush)

Now, we remove the 6 of diamonds and place it with the 2 3 4 5...

We have 5 pat hands!!!

Four Queens : QD QH QS QC JS

straight : 2S 3C 4D 5H 6D

Flush : AH 4H 7H 8H 9H

Flush : AC 4C 5C 6C KC

Flush : 5D 8D 10D JD KD