There are four turns in a round of Texas Hold'em:

**Turn 1:** Each player receives two cards face down. The first player is able to make a bet solely based on the two cards they have and the cards' values. Then it is the next player's turn, and they can either bet, fold, check, or raise, depending on the previous player's actions.

**Turn 2:** Three community cards are dealt face up for all players to see. Each player now has a five card combination from their own hand that no one but themselves can see, and the three community cards. Then the betting begins.

**Turn 3:** A fourth community card is dealt. Each player can now make a five card combination from their own hand and the four community cards. Then the betting begins.

**Turn 4:** A fifth community card is dealt. Each player can now make a five card combination from their own hand and the five community cards. Then the betting begins.



Figure 2

K - 2	33,09	1,010	1,446	0	0,09184	0,03061	S	2,526	0	0
K - 3	33,09	1,010	1,446	0	0,09184	0,03061	S	2,526	0	0
K - 4	33,09	1,010	1,446	0	0,09184	0,03061	S	2,526	0	0
K - 5	33,09	1,010	1,446	0	0,09184	0,03061	S	2,526	0	0
K - 6	33,09	1,010	1,446	0	0,09184	0,03061	S	2,526	0	0
K - 7	33,09	1,010	1,446	0	0,09184	0,03061	S	2,526	0	0
K - 8	33,09	1,010	1,446	0	0,09184	0,03061	S	2,526	0	0
K - 9	33,09	1,010	1,446	0,1633	0,09184	0,03061	S	2,526	0,002551	0
K - 10	33,09	1,010	1,446	0,3265	0,09184	0,03061	S	2,526	0,005102	0,002551
K - J	33,09	1,010	1,446	0,3265	0,09184	0,03061	S	2,526	0,005102	0,002551
K - Q	33,09	1,010	1,446	0,3265	0,09184	0,03061	S	2,526	0,005102	0,002551
K - K	100	16,90	11,51	0	0,7347	0,2449	D	0	0	0
K - A	33,09	1,010	1,446	0,3265	0,09184	0,03061	S	2,526	0,005102	0,002551
A - 2	33,09	1,010	1,446	0	0,09184	0,03061	S	2,526	0	0
A - 3	33,09	1,010	1,446	0	0,09184	0,03061	S	2,526	0	0
A - 4	33,09	1,010	1,446	0	0,09184	0,03061	S	2,526	0	0
A - 5	33,09	1,010	1,446	0	0,09184	0,03061	S	2,526	0	0
A - 6	33,09	1,010	1,446	0	0,09184	0,03061	S	2,526	0	0
A - 7	33,09	1,010	1,446	0	0,09184	0,03061	S	2,526	0	0
A - 8	33,09	1,010	1,446	0	0,09184	0,03061	S	2,526	0	0
A - 9	33,09	1,010	1,446	0	0,09184	0,03061	S	2,526	0	0
A - 10	33,09	1,010	1,446	0,1633	0,09184	0,03061	S	2,526	0.002551	0,002551
A - J	33,09	1,010	1,446	0,3265	0,09184	0,03061	S	2,526	0, 05102	0,002551
A - Q	33,09	1,010	1,446	0,3265	0,09184	0,03061	Ó	2,-26	0,005102	0,002551
A - K	33,09	1,010	1,446	0,3265	0,09184	0,0300	5	2,526	0,005102	0,002551
A - A	100	16,90	11,51	0	0,7317	0,2449	D	0	0	0

The values above have all been rounded to 4 significant indices, as any more figures would not change the percentage crough to be relevant for this exploration.

## Calculations

As can be seen, there is a great deal of repeated probabilities. However, there are fifteen unique calculations, which I have explained below by giving sample calculations of the actual probabilities above. The calculations are the probabilities of certain cards showing up in turn 2, and assume that a total number of 50 cards can be chosen from, as you already have two in your hand.

Probability(2 - 3, Pair) =  $\left(\left(\frac{3}{50}\right) \times \left(\frac{47}{49}\right) \times \left(\frac{46}{48}\right)\right) \times 3 \times 2$ × 100% = 33.0918% = 33.09% To get a pair with a hand of a 2 and a 3, one of the three community cards need to be a 2 or a 3. There is a 3/50 chance of getting a 2 (since there are three 2's left in a total of 50 cards). Then a 47/49 chance of getting anything but a 2, since if you get another 2, you would have a two pair. Then a 46/48 chance of getting anything but a 2 again.

This is then multiplied by three as the second 2 can show up in any order, and then it is multiplied by two as you could also form a pair with the 3 in your hand.