

Mathematical Analysis of Three-Card Deuces Wild

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Game Rules

1. Each player places a wager on the Ante bet and/or the “Straight Up” side bet.
2. The dealer shuffles a 52-card deck and deals each player (including himself) three cards face-down.
3. Players may examine their cards. Players who have placed a wager on the Ante bet must decide whether to remain in the game or fold. To remain in the game, the player must make a Play bet equal to their Ante bet.
4. After all players have made their decisions, the dealer shall reveal his cards. If the dealer’s hand ranks Queen-high or better, then the dealer “qualifies.”
5. Ante and Play wagers are resolved as follows:
 1. If the dealer did not qualify, the Ante bet pays even money and the Play bet pushes.
 2. If the dealer qualifies and has a higher-ranking hand than the player, both the Ante and Play bets lose.
 3. If the dealer qualifies and ties the player’s hand, both the Ante and Play bets push.
 4. If the dealer qualifies and has a lower-ranking hand than the player, the Ante and Play bets pay even money.
6. Any player who placed a wager on the “Straight Up” side bet shall be paid based on the player’s hand according to the “Straight Up” payable, regardless of the outcome of any showdown.
7. The ranking of hands in Three-Card Deuces Wild is as follows:
 1. Three Deuces
 2. Two Deuces
 3. Three of a Kind
 4. Straight Flush
 5. Flush
 6. Straight
 7. One Pair
 8. High Card

A wild card always takes the place of the highest rank that will complete the hand. For example, with $2\clubsuit K\spadesuit Q\heartsuit$ the wild card will act as an Ace. With $A\heartsuit K\diamondsuit 2\spadesuit$ the wild card will act as a Queen.

Hands are ranked by the highest card first, then the second-highest card if necessary, and finally the lowest card if the two highest cards are of the same rank. For example, $K\diamondsuit 7\heartsuit 3\clubsuit$ beats $K\spadesuit 6\clubsuit 5\diamondsuit$.

No distinction is made between wild and natural versions of the same hand. For example, $2\diamondsuit 4\heartsuit 5\spadesuit$ and $4\clubsuit 5\diamondsuit 6\spadesuit$ are both considered to be a 6-high straight, and will thus tie. $2\spadesuit K\diamondsuit 3\heartsuit$ and $K\clubsuit K\heartsuit 3\clubsuit$ are both considered a pair of Kings with a 3 kicker, and will also tie.

Ante Game Analysis

The following table summarizes each possible outcome for the Ante game with perfect player strategy:

Outcome	Pays	Combinations	Probability	Return
Player Wins	+2	124,961,632	0.306903	0.613805
Dealer Not Qualified	+1	60,640,116	0.148931	0.148931
Push	0	403,872	0.000992	0.000000
Player Folds	-1	123,809,280	0.304072	-0.304072
Dealer Wins	-2	97,355,500	0.239103	-0.478205
Totals		407,170,400	1.000000	-0.019542

Ante Game Strategy

Raising the highest Queen-high hand (**QJ9**) has an expected value of -1.0669 , which is lower than the expected value of folding (-1.0000). Raising the lowest King-high hand (**K43**) has an expected value of -0.9671 , which is higher than the expected value of folding. Therefore, perfect player strategy is to raise every hand which ranks King-high or better, and to fold every hand which ranks Queen-high or lower.

Ante Game Summary

The house edge of the ante bet is 1.9542%
 The average total wager is 1.6959 times the ante
 The house edge of the average total wager is 1.1523%

“Straight Up” Side Bet

The Straight Up side bet is a bonus bet which pays solely based on the value of the player’s hand (regardless of the dealer’s hand, and whether or not it is better than the player’s hand). Winning hands for this bet are paid according to the following table:

Hand	Pays	Combinations	Probability	Return
Three Deuces	+40	4	0.000181	0.007240
Two Deuces	+20	288	0.013032	0.260633
Three of a Kind	+10	336	0.015204	0.152036
Straight Flush	+8	392	0.017738	0.141900
Flush	+2	1,544	0.069864	0.139729
Straight	+1	1,656	0.074932	0.074932
All Other	-1	17,880	0.809050	-0.809050
Totals		22,100	1.000000	-0.032579

“Straight Up” Side Bet Strategy

There is no strategy involved with this wager.

“Straight Up” Side Bet Summary

The house edge of the Straight Up side bet is 3.2579%