



## Lucky Draw Baccarat

**Lucky Draw Baccarat is a variation of baccarat played against the dealer. The object of the game is to beat the dealer's hand by having a point total closest to 9.**

The game uses the same point system as baccarat. Tens and face cards are worth 0 points, aces are worth 1 point, and cards 2 through 9 are scored at face value. The point total of a hand is the last digit of the sum of its cards. The game is played using eight standard 52-card decks.

### Quick Rules

1. To begin, the player makes a Enter-Bet. The player may also make an optional Block Bonus™ bet.
2. The dealer deals two cards face up to the player. He deals to himself, one card face up and one card face down.
3. The player may stand with his current hand or draw an additional card by making a Draw-Bet equal to his Enter-Bet.
4. After all players have acted, the dealer reveals his hole card and draws an additional card if his twocard total is 4 or less. The dealer must stand with five points or higher.
5. The dealer compares his total to the player's total.
  - If the dealer's total is higher than the player's total, the player loses his Enter-Bet and Draw Bet (if made).
  - If the dealer's total is equal to the player's total, the player's Enter-Bet and Draw-Bet (if made) push.
  - If the player's total is higher than the dealer's total, the player wins and is paid 1 to 1 on his Enter-Bet.
  - The Draw-Bet, if made, is paid according to the posted DrawWin™ pay table.



### Features ↓

- Fast paced game play
- Simple to play with odds of up to 35 to 1
- Choice of pay tables
- Quick to learn for customers and staff
- Very low cost and easy to introduce to a casino floor
- No need for complicated electronic scoring
- Layouts fit standard Blackjack style tables
- Optional Side Bet: Block Bonus™

The player wins if one of his first two dealt cards is of the same suit and of higher rank than the dealer's first card (see pay-table and details on next page)



### Pay Tables

DrawWin™ Pay Table				
Hand	Option 1	Option 2	Option 3	Option 4
Lucky 9 (a 3-card 9)	3 to 1	2 to 1	3 to 1	3 to 1
Lucky 8 (a 3-card 8)	2 to 1	3 to 1	2 to 1	2 to 1
Lucky 7 (a 3-card 7)	2 to 1	2 to 1	3 to 2	1 to 1
6 or less	1 to 1	1 to 1	1 to 1	1 to 1
House Advantage	1.7931%	2.1353%	3.3448%	4.7153%

Block Bonus™ Pay Table		
Block Type	Description	Pays
Ultimate Block	Two cards the same rank, higher and both of them are the same suit as the dealer's first card.	35 to 1
Pair Block	Two cards the same rank, higher and one of them is the same suit as the dealer's first card.	10 to 1
Flush Block	Two cards the same suit and one/both cards are higher and in the same suit as the dealer's first card.	5 to 1
Normal Block	One card higher and in the same suit as the dealer's first card.	2 to 1

### Mathematical Analysis

To analyze the game, a program was written in Java to cycle through and evaluate all outcomes of the game. The following is an outline of the steps executed by the program.

1. Cycle through the 10 ways to deal the player's first card, followed by the 10 ways to deal the player's second card, followed by the 10 ways to deal the dealer's up card.
2. For each set of two player's cards versus dealer's up card in step 1, calculate the expected value (EV) of standing by cycling through the 10 possible dealer hole cards followed by the 10 possible dealer hit cards on two-card totals of four or less. Compare the player's hand to the dealer's hand and determine the net result. After cycling through all possible dealer outcomes, the weighted average of the results is the EV of standing.
3. For each set of two player's cards versus dealer's up card in step 1, calculate the EV of hitting by cycling through the 10 possible hit cards and then calculating the EV of standing using the methodology in step 2.
4. Compare the EV of standing to the EV of hitting and record the higher value. This value represents the EV of the optimal playing decision for the cards of step 1.
5. Keep a running tally of the results of the previous step. The final weighted average is the expected value of the Enter-Bet, the negative of which is the house edge.



### Mathematical Analysis Continued

Analysis - Pay Table A					
Outcome	Net	Permutations	Probability	Frequency	EV
Wins 3-card 1	2	29,582,367,318,016	0.005918	1 in 169	0.011837
Wins 3-card 2	2	53,437,210,656,768	0.010691	1 in 94	0.021382
Wins 3-card 3	2	76,123,174,156,288	0.01523	1 in 66	0.030459
Wins 3-card 4	2	99,199,375,620,096	0.019846	1 in 50	0.039692
Wins 3-card 5	2	120,764,648,513,536	0.024161	1 in 41	0.048321
Wins 3-card 6	2	141,094,713,692,160	0.028228	1 in 35	0.056456
Wins 3-card 7	3	187,449,102,487,552	0.037502	1 in 27	0.112506
Wins 3-card 8	3	196,730,517,893,120	0.039359	1 in 25	0.118076
Wins 3-card 9	4	268,258,336,385,024	0.053669	1 in 19	0.214675
Ties, three cards	0	331,770,687,432,960	0.066375	1 in 15	0
Lose, three cards	-2	1,953,656,227,545,080	0.390856	1 in 2.6	-0.781713
Wins, two cards	1	2,296,023,302,144	0.188794	1 in 5.3	0.188794
Ties, two cards	0	498,080,177,152	0.040955	1 in 24	0
Lose, two cards	-1	953,662,734,336	0.078416	1 in 13	-0.078416
<b>TOTAL</b>			1		-0.017931
<b>House Edge</b>					<b>1.79%</b>

Analysis - Pay Table B					
Outcome	Net	Permutations	Probability	Frequency	EV
Wins 3-card 1	2	29,974,877,691,904	0.005997	1 in 167	0.011994
Wins 3-card 2	2	54,157,656,250,368	0.010835	1 in 92	0.02167
Wins 3-card 3	2	77,355,504,252,928	0.015476	1 in 65	0.030952
Wins 3-card 4	2	100,982,507,843,584	0.020203	1 in 49	0.040406
Wins 3-card 5	2	123,075,181,940,736	0.024623	1 in 41	0.049246
Wins 3-card 6	2	143,772,326,805,504	0.028764	1 in 35	0.057527
Wins 3-card 7	3	186,633,431,255,040	0.037339	1 in 27	0.112016
Wins 3-card 8	4	251,796,571,971,584	0.050375	1 in 20	0.201502
Wins 3-card 9	3	237,697,124,753,408	0.047555	1 in 21	0.142664
Ties, three cards	0	340,114,632,452,352	0.068045	1 in 15	0
Lose, three cards	-2	1,991,499,648,133,370	0.398428	1 in 2.5	-0.796855
Wins, two cards	1	2,194,409,605,120	0.180438	1 in 5.5	0.180438
Ties, two cards	0	474,426,482,944	0.03901	1 in 26	0
Lose, two cards	-1	886,732,797,952	0.072913	1 in 14	-0.072913
<b>TOTAL</b>			1		-0.021353
<b>House Edge</b>					<b>2.14%</b>



Mathematical Analysis Continued

Analysis - Pay Table C					
Outcome	Net	Permutations	Probability	Frequency	EV
Wins 3-card 1	2	25,337,362,898,944	0.005069	1 in 197	0.010138
Wins 3-card 2	2	46,454,649,438,208	0.009294	1 in 108	0.018588
Wins 3-card 3	2	66,550,357,178,368	0.013314	1 in 75	0.026629
Wins 3-card 4	2	87,151,028,408,320	0.017436	1 in 57	0.034872
Wins 3-card 5	2	106,148,673,413,120	0.021237	1 in 47	0.042473
Wins 3-card 6	2	105,726,728,769,536	0.021152	1 in 47	0.042304
Wins 3-card 7	2.5	137,012,025,251,840	0.027411	1 in 36	0.068528
Wins 3-card 8	3	167,922,525,855,744	0.033595	1 in 30	0.100786
Wins 3-card 9	4	198,673,673,889,792	0.039747	1 in 25	0.15899
Ties, three cards	0	278,975,692,912,896	0.055813	1 in 18	0
Lose, three cards	-2	1,738,759,438,635,000	0.347863	1 in 2.9	-0.695727
Wins, two cards	1	3,123,900,030,976	0.256867	1 in 3.9	0.256867
Ties, two cards	0	648,282,913,792	0.053306	1 in 19	0
Lose, two cards	-1	1,190,557,003,776	0.097895	1 in 10	-0.097895
<b>TOTAL</b>			1		-0.033448
<b>House Edge</b>					<b>3.34%</b>

Analysis - Pay Table D					
Outcome	Net	Permutations	Probability	Frequency	EV
Wins 3-card 1	2	25,320,979,947,520	0.005066	1 in 197	0.010132
Wins 3-card 2	2	46,319,618,015,232	0.009267	1 in 108	0.018534
Wins 3-card 3	2	66,499,952,130,048	0.013304	1 in 75	0.026609
Wins 3-card 4	2	87,083,707,731,968	0.017422	1 in 57	0.034845
Wins 3-card 5	2	106,064,512,606,208	0.02122	1 in 47	0.042439
Wins 3-card 6	2	105,604,515,139,584	0.021128	1 in 47	0.042255
Wins 3-card 7	2	136,857,539,139,584	0.02738	1 in 37	0.054761
Wins 3-card 8	3	167,725,265,641,472	0.033556	1 in 30	0.100667
Wins 3-card 9	4	198,446,551,410,688	0.039702	1 in 25	0.158808
Ties, three cards	0	278,574,931,556,608	0.055733	1 in 18	0
Lose, three cards	-2	1,735,631,381,106,680	0.347238	1 in 2.9	-0.694475
Wins, two cards	1	3,124,959,158,272	0.256954	1 in 3.9	0.256954
Ties, two cards	0	648,815,590,400	0.05335	1 in 19	0
Lose, two cards	-1	1,200,116,543,488	0.098681	1 in 10	-0.098681
<b>TOTAL</b>			1		-0.047153
<b>House Edge</b>					<b>4.72%</b>

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