

Optimal Blackjack Strategy

The rules of play

1. *The number of players.* At most blackjack tables, there is one dealer and from one to six players. The player to the dealer's left receives his cards first, and is said to be on "first base." The final player on the dealer's right is the last to get his cards, and is said to be on "third base."¹
2. *The deck.* Most casinos continue to use 52 card decks, often two decks or six decks at a time to discourage card counters. However many decks the dealer is using, he will stop roughly half way through and reshuffle.
3. *Betting.* The players make their bets before any cards are dealt.
4. *The deal.* The players and dealer each receive two cards each, the dealer's one up and one down, the players both down. Cards received down are typically referred to as "hole" cards.
5. *Numerical value of the cards.* The numerical value of each face card—jack, queen, and king—is ten. Except for the ace, the numerical value of each other card is simply that card's face value. Critically, the ace can be counted as either a one or an eleven. We refer to a hand with an ace in it as a "soft" hand and a hand without an ace in it as a "hard" hand.
6. *Object of play.* The goal of (casino) blackjack is to obtain a total that is greater than the dealer's but does not exceed twenty-one.
7. *Naturals.* If either the player or the dealer receives a total of 21 on his first two cards, the hand is called a *natural*. If a player has a natural and the dealer does not, the player receives $1\frac{1}{2}$ times his original bet from the dealer. If the dealer has a natural and the player does not, the player loses his original bet. If both the player and the dealer have naturals, no money exchanges hands.
8. *The player's draw.* Beginning with the man on first base, the dealer goes around the table asking each player if he would like more cards. The player can take as many cards as he likes, one at a time, face up, until he either "stands" (quits taking cards) or "busts" (goes over 21). If the player busts, he must immediately turn up his hole cards, and he loses his original bet, which is a critical rule in two respects. First, it means that even if the dealer eventually busts, the player has lost—the casino's primary advantage. And second, it means that the remaining players get to see this player's cards prior to making their own decisions.
9. *The dealer's draw.* In almost any casino, the dealer's play will be fixed and his rules of play will be posted at the table. The most common dealer play is as follows: once the players all have their cards, he turns up his single hole card. If his total is 16 or less he *must* draw another card. If his total is 17 or more, he *must* stand. He continues drawing until his total is 17 or more.
10. *The settlement.* If the player doesn't bust and the dealer does, the player wins even money (the amount he bet). If neither the player nor the dealer busts, the one with higher total wins an amount equal to the player's original bet. If the dealer and the player both have the same total, no money exchanges hands.
11. *Splitting pairs.* If a player's initial two cards form a pair (identical, except in suit), he can choose to turn them both face up and play out two separate "twin" hands. His original bet goes on one of the two hands, and an equal amount is bet on the other, thus doubling the player's total bet. The player automatically receives a second card face down on each of the split cards and may continue drawing cards face up as usual. One exception to this general rule is that if a player splits aces, he gets exactly one additional card on each hand. If the points in one of his hands sums to 21 in this case, *it does not count as a natural*. (Similarly, if the player has split tens or face cards, an ace will not give him a natural.) Finally, if a player splits a pair and receives a third matching card on one of the hands, he is not permitted to split the new hand.
12. *Doubling down.* After looking at his initial two cards, but before he has drawn, a player may elect to double his bet and draw exactly one more card. A player splitting any pair besides aces can elect to double down on one or both of his twin hands.

¹Try to ignore the fact that this is exactly opposite to a batter's view of the baseball diamond.

The Optimal Strategy

The basic strategy

First, ignoring the possibilities of splitting pairs or doubling down, the player should proceed as in the following table.

Dealer shows	Player stands on (hard)	Dealer shows	Player stands on (soft)
2,3	≥ 13	9,10	≥ 19
4,5,6	≥ 12	Otherwise	≥ 18
Otherwise	≥ 17		

Doubling Down

The following tables identify when a player should double down his bet. He should follow this strategy in lieu of the basic strategy.

Dealer shows	Player doubles down on (hard)	Dealer shows	Player doubles down on (soft)
$2 \leq D \leq 6$	9,10,11	3,4,5,6	17
$2 \leq D \leq 9$	10,11	4,5,6	18
$2 \leq D \leq 10$	11	5,6	13,14,15,16
		5	12

Splitting Pairs

For splitting pairs, the strategy is given in the following table. Notice that there is no overlap with the player's doubling down strategy.

Dealer shows	Player splits on pair of
Anything	Aces or 8's
$2 \leq D \leq 6,8,9$	9's
$2 \leq D \leq 8$	7's
$2 \leq D \leq 7$	2's, 3's, or 6's
$D = 5$	4's

Practical Advice on Games of Chance

What follows is a brief checklist of things you should at least be aware of about gambling.

- 1. Play new casinos.** When a new casino opens, the best way for it to advertise is to produce lots of winners, with jackpots so big they're written up in local papers. Don't miss out on these opportunities.
- 2. Play conspicuous machines.** Casino owners only grudgingly let anybody win, but you can be pretty sure that if they're going to let someone win, they're going to make sure their other patrons see it happen. Who wants to spend time in a casino where nobody ever wins? So play that corner slot machine near the entrance.
- 3. Don't believe everything the casino tells you.** After reading Practical Advice Number 2, you might wonder, "Is it legal for casinos to have machines that look identical but have different pay schedules?" You bet it is.² In order to avoid false-advertisement law suits, all any casino has to do is have one game on site (and available) that wins with the advertised percentage. So, when you see an enormous sign over the video poker games that reads, "98% Payout" (i.e., that you only lose, on average and with perfect play, 2% of your money—not bad as far as video poker goes), your job as an intelligent gambler³ is to find that machine. Which brings us to...

²So to speak.

³Oxymoron?

4. Play inconspicuous games with high payouts. Admittedly, unless you become a professional gambler and begin spending the entirety of your time in casinos, this will be one of the hardest things to recognize. But occasionally, casino owners will hide away the one high-payout machine mentioned in Practical Advice Number 3 in some remote corner of the casino, sometimes flanked by a long line of machines that haven't paid since Truman was in office. Your best bet for finding these is to watch people who look like they *do* spend the entirety of their time in casinos.

5. Play (conspicuous) machines that have been dry. If you're flipping a fair coin, and you get ten tails in a row, what's the probability that the next flip turns up tails again? Still one-half. Ideally, such machine games as video poker and slot machines would work the same way, and you would never need to bother with trends. The fact of the matter, however, is that the computers generating play for these games aren't entirely random. For example, it's statistically possible for a slot machine to hit the ten million dollar jackpot ten times in a row, thus bankrupting the casino in five minutes of play. The game's internal computer won't let this happen. By the same token, it's statistically possible for the machine to serve out its life without ever producing a winner. This, also, at least for conspicuous games, won't happen. So, when that old lady finally drags herself dejectedly from her perch in front of the corner slot machine near the entrance, slide in and pluck in some coins.

6. Complexity is your friend. If a game is straightforward enough so that anyone walking in off the street can immediately recognize the probabilities involved, then it *has* to be a losing game. Otherwise, everyone walking in off the street would win it, and the casino would soon be out of business. The more difficult a game is to analyze, the more likely there's some subtle nuance to be taken advantage of. (Think, for example, of tax laws. While a flat tax would be impossible for anyone to legally dodge, the sprawling system currently in place has bizarre loopholes that can reduce a studied citizen's taxes by thousands (or a business's by millions).)