

# Blackjack Truth...

What Every Player Needs to Know to Win

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By Jim Caldarella, Kate Simmons, and Alex Kelly



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## Preface

The last thing the world needs is another book about blackjack. Players know what they're doing nowadays. They have thousands of books, websites, videos, gurus, and other players to turn to for advice. They are also a lot more careful with their money since most casinos have raised their minimum-bet amount.

Unfortunately, none of this is true. Watch players at any blackjack game and you will see them making one "statistically wrong" decision after another. Not just minor goofs, but major blunders that can ghost a bankroll quickly. Incredibly, this is true even for experienced players.

You don't believe it...? According to the Nevada Gaming Control Board, in 2022 players lost **14% of the \$9.3 billion** they bet on blackjack, 28 times more than the 0.5% they should have lost due to the casino's (house) advantage.

Why...? Blackjack players are generally knowledgeable, smart, and competitive; why are they losing so much? The simple answer is that most players play casually for fun and consider their losses an entertainment expense.

Fair enough; however, winning is a lot more fun than losing, and since it takes very little effort to win consistently, why not win? In fact, all the recreational player really needs to play well is **the truth**. And there's the rub -- the truth is hard to find amidst all the confusing, contradictory, and incorrect advice about the game.

Our goal with this short book is to filter out the dross and give players the essential information they need to win more often.

# Caveats

## **The house always wins in the long run.**

The game's rules give the casino a statistical advantage of about .05% to 1% over the player. In time, this small edge will allow the casino to win more than the player. However, it's also true that this 49% to 51% split of the winnings will allow the player to win almost as many sit-down sessions as the casino.

Isn't this what we want? Recreational players don't play blackjack to make a living. They play for fun, and to have fun you need to win often, which is entirely possible with blackjack's great odds.

## **Don't aspire to be a pro, card counter, or cheat.**

No matter how good a player a "professional" is, he is still subject to the same 49% to 51% best-case odds as the recreational player, and he will lose over time.

Card counters track the cards to gain a small statistical advantage over the casino and it's true, they can win consistently. What no one ever talks about with card counting, however, is that this is the world's most tedious and stressful task, not something a recreational player would want to do.

Cheaters can also win consistently with a good scam, but eventually they will get caught and end up in the hoosegow. This is not a desirable outcome for the recreational player either.

## **This book is not for online blackjack players.**

Much of the fun of blackjack comes from being immersed in the casino’s ambiance, it’s unique noise and excitement, and in the anticipatory thrill of winning in front of an audience. Playing online is a good way to practice for “the real thing,” but it’s hardly in the same class of entertainment.

**This book uses “he, him, his” pronouns.**

For the sake of brevity and simplicity, we refer to male players and use the traditional male pronouns. This is not a put-down of anyone’s gender, anatomy, lifestyle, or of the woke revolution, it’s just easier.

**The authors are not blackjack experts, mathematicians, or part of the gambling establishment.**

Jim Caldarella is a retired banking executive and long-time student of the game. Kate Simmons is an editor and blackjack novice whose *inexperience* helped us maintain a sharp focus on what players need to know to win. Alex Kelly is knowledgeable about statistics and data analysis and used these skills to check the validity of our technical descriptions.

**There may be minor errors, misstatements, or omissions.**

We stand by everything we say herein and provide full explanations for our assertions, but we concede that this writing may not be perfect. We’re hoping the reader will give us a pass on small issues.

**We are not giving gambling advice.**

We are providing recreational players with information they can use to have more fun at the game. Winning and losing can never be guaranteed.

## Acknowledgements

All blackjack players owe a debt to Roger Baldwin, the creator of “basic strategy” -- the statistical analysis that identifies the best move for every possible hand. We also owe kudos to his Army buddies -- Wilbert Cantey, Herbert Maisel, and James McDermott -- mathematicians who helped Mr. Baldwin find these right answers. These “Four Horsemen of Aberdeen” created the modern game.

Other blackjack illuminati we owe a debt to are...

- Edward O. Thorp, who brought basic strategy to public attention with his 1962 book, *Beat the Dealer*. He invented the first card-counting system, which sparked massive interest in the game by showing it was possible to, well, to beat the dealer.
- John Ferguson, a.k.a. Sanford Wong, a blackjack pioneer who made the game’s odds and probabilities the topic of countless conversations with his 1975 book, *Professional Blackjack*.
- Michael Shackleford, an actuary by profession, who created the website, *Wizard of Odds* ([www.wizardofodds.com](http://www.wizardofodds.com)), which gives millions of today’s players excellent advice and guidance. He and his website have been a primary reference for this book.
- Literally thousands of other legitimate writers, mathematicians, statisticians, and players who have shared their insights to help make the game an enjoyable pastime for millions.



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# WHAT'S NEEDED TO WIN?

## Players win more often with blackjack.

Blackjack's rules typically give the casino (the house) a small advantage over the player of about 1%. Some casinos have rules that reduce this advantage to 0.5%. This means on average the player should only lose about 50¢ for every \$100 bet.

So, why do blackjack players consistently lose much more than 50¢ for every \$100 bet? There are five big reasons:

- They make sucker bets
- They make basic strategy mistakes
- They don't start with an adequate bankroll
- They don't have an exit plan
- They hedge when they are losing

Each of these is addressed at a high level in this "What's Needed to Win" section, and with more specificity in "The Details" section. If the reader just wants to skim through, we've added red headlines in this revision.

This first section assumes the reader has a working knowledge of the game's rules. If not, the reader should read the "Rules of the Game" section first.

# DON'T MAKE SUCKER BETS

## Needed to Win

- **YOU'RE HERE...Don't make sucker bets**
- Learn basic strategy
- Play with an adequate bankroll
- Have an exit plan
- Don't hedge when you're losing

## **A sucker bet is where the risk far outweighs the reward.**

Blackjack has four kinds of sucker bets -- insurance, even money, side bets, and “the 6:5 payoff” game (where the casino pays \$6 on a player’s blackjack for every \$5 bet). We recommend players avoid all of these.

Most players: agree with our recommendation when it comes to insurance, disagree when it comes to even money; and they are split on side bets and “the 6:5 payoff game.” Their logic and ours is in the following sections.

## Don't Take Insurance

### **Insurance protects your bet when the dealer has an ace.**

The dealer offers the player insurance whenever the dealer’s face-up card is an ace. Insurance allows the player to “insure” his original bet against a potential dealer blackjack, which is now more likely with the ace showing.

To take this offer, the player puts as much as one-half of his original bet on the table’s insurance line. If when the dealer peeks at his cards, he does have blackjack, the player loses his bet, but the dealer pays him 2:1 on his insurance (\$2 for every \$1 of

insurance). This allows the player to break even (assuming his insurance amount is one-half of his original bet). For example, if the player's original bet is \$20 and he buys \$10 of insurance, he loses his \$20 but receives a \$20 insurance payoff if the dealer has blackjack. If the dealer doesn't have blackjack, he loses his \$20.

### **Insurance never offers an adequate payoff.**

A great deal, right...? Unfortunately, it's not. The 2:1 payoff for insurance is insufficient given the risk -- that the dealer's face-down card is a ten...giving him blackjack. Specifically, the odds of the face down card being a ten are 36 to 16 or 2.25 to 1. (There are 36 cards in the deck that do not have the value of 10 and 16 that do.) By paying the player only \$2 rather than \$2.25, the house is gaining an 8% edge, which is too much in a game where the house typically has an edge of <1%.

Players know this, but sometimes they take insurance anyway with the argument that they are taking insurance "to protect their large bet." This makes little sense as the insurance is still too expensive no matter how large the original bet. The only explanation is that they now regret having made a large bet and want to protect themselves against losing it, which is also illogical as simply losing the hand would result in them losing it...so what's changed...?

### **Only Take Even Money in a 6:5 Game**

**Even money allows a player to get paid for his blackjack.**

The dealer offers the player “even money” when the player has blackjack and the dealer’s face-up card is an ace. The idea is that the player can avoid a tie with the dealer, which pays nothing, by taking the 1:1 “even money” offer. This compromise allows him to avoid risking everything to get the normal blackjack premium payoff of 3:2 or 6:5.

The “even money bet” is basically another bet that the dealer’s face down card is a ten. The bet amount in this instance is the blackjack premium (the 3:2 payoff versus the 1:1 payoff).

### **Never take even money when the blackjack payoff is 3:2.**

Even money sounds like a great deal, right...? Unfortunately, the even money payoff is insufficient based on the risk when the blackjack payoff is 3:2 (\$3 for every \$2 bet). Specifically, in the “even money bet” the house has a 4% edge.

Interestingly, this conclusion is reversed when the return on blackjack changes from 3:2 to 6:5.

### **Always take even money when the blackjack payoff is 6:5**

Just the opposite is true when the blackjack payoff is 6:5 (\$6 for every \$5 bet). In the 6:5 game, the even money payoff is a better choice, giving the player a 20% edge over the house.

Typically, a casino would change the rules to avoid giving the player a 20% edge on anything. In this case, however, most casinos don’t bother addressing the 20% player advantage as even money opportunities happen so rarely, and the money in the 6:5 game is usually small.

## **Get ready to be heckled for your even money decision.**

Almost all players take the even money offer no matter what the blackjack premium. The popular argument is usually summed up in the old saying, “a bird in the hand (meaning the player’s blackjack) is worth two in the bush.” This might be right for birds, but with blackjack it’s wrong. A better saying is, “a bird in the hand is worth two in the bush unless there’s a good chance of bagging the two in the bush.”

## **Don’t Make Side Bets**

### **A side bet is a bet based on the cards on the table.**

Side bets are bets that a player can make “on the side” based on the value of the cards being dealt in the blackjack game, but which are unrelated to the game itself. For example, the player wins the side bet called “21+3” when his first two blackjack cards and the dealer’s up card form a 3-card flush, straight flush, straight, or three-of-a-kind. The player wins the side bet called “Royal Match” when his two blackjack cards are a pair of the same suit (e.g., two queens of heart).

### **Mathematically, it’s best to avoid all side bets.**

Almost all side bets give the casino an unreasonable advantage over the player and should be avoided. For example, the house edge is 3.24% with “21+3,” 3.7% with “Royal Match,” and 12% with “Super Sevens.”

### **Only make side bets as a lottery play.**

Side bets are long shots with bad odds. However, if you like the idea of “a small bet with a big payoff,” then go ahead and play the side bet like a lottery.

## **Play the 6:5 Game Only When Necessary**

### **Generally speaking, it's hard to win in the 6:5 game.**

Many casinos offer a 6:5 blackjack payoff (\$6 for every \$5 bet) at low-minimum (less than \$15) tables and a 3:2 payoff at higher-minimum (\$15 or more) tables. Since the 6:5 payoff increases the house edge from 0.5% to about 2%, some players refuse to play the 6:5 tables under any circumstances. We agree with this decision in general, however...

### **Come on, it's a game.**

We don't think players should be so rigid all the time...it's a game you're playing for entertainment, remember? Sure, it's harder to win the 6:5 game, and of course players should favor the 3:2 game, but the higher table minimums required at the 3:2 game tables often put this option outside the player's overall risk tolerance.

In our view, a player should play the 6:5 game if he can afford to lose his bankroll, if there are no better entertainment options, and if he can play a near-perfect basic strategy game. These conditions often exist on cruise ships where passengers have no other options.

# LEARN BASIC STRATEGY

## Needed to Win

- Don't make sucker bets
- **YOU'RE HERE...Learn basic strategy**
- Play with an adequate bankroll
- Have an exit plan
- Don't hedge when you're losing

## **The biggest reason players win or lose is luck.**

It sounds obvious, but if luck is with you during your playing session, you will win; if it's not, you'll lose.

Losses due to luck can be mitigated slightly by following our sucker-bet advice. They can be mitigated to a much larger degree by making the "right" decision about hitting, standing, doubling, splitting, and surrendering. By "right" we mean the decision that gives the player the best chance to win the hand. Together, these "right" decisions are known as basic strategy.

Many players ignore luck and errors and assume that they lose at blackjack because of the casino's advantage (the house edge). This is simply not true. The house edge is a much smaller factor in winning and losing than luck, sucker bets, basic strategy mistakes, and almost all variances in table rules.

## **Learning all of basic strategy is critical to winning.**

Players typically have a fairly good idea of when to hit or stand. What they often lack is a complete understanding of when to double, split, and surrender. These are harder to learn, but they are the players' big moneymakers. Making the wrong



choices to double, split, or surrender is often the difference between winning and losing.

*This is so important, we need to repeat it. Most players make all the right decisions when it comes to hitting and standing, but often make the wrong decision when it comes to doubling, splitting, and surrendering. This is true for both novices and experienced players and is frequently the reason players lose.*

Very few players can play a perfect basic strategy game. In fact, the “average” player makes mistakes that cost him about 1.5% of the total amount he bets. Poor players can easily make mistakes that cost them 10% of the amount bet. What does this mean in real money terms? The average rate of play is typically 50 hands per hour. If the table minimum is \$25 then \$1,250 will be bet in an hour. If the session lasts three hours, the total bet will be \$3,750. Consequently, in this one session a poor player can lose \$375 *before taking luck into account*. This doesn’t leave much room to win anything.

The message here is that to win your fair share, you must learn basic strategy.

### **Basic strategy comes from probability analysis.**

Basic strategy, which is often called “the book,” is a set of predetermined recommendations for when the player should stand, hit, double, split, or surrender. These recommendations are based on a statistical analysis of blackjack rules, the table-specific rules, the player’s hand, and the dealer’s face-up card. They

give the player his one-and-only best chance of winning the hand.

The *best chance*...! Players should take these words literally. The basic strategy recommendations are literally and statistically the very best chance the player has of winning the hand.

This is not to say that the player will win the hand if they follow the recommendation. Sometimes, the recommendation allows the player to lose less often; sometimes they are just marginally better than the next-best choice. For example, when the player has a 16 and the dealer's up card is a ten, the basic strategy recommendation is to hit. This recommendation is only 6/1000ths better than to stand (six out of 1,000), but it is better. What it means exactly is that in 1,000 hands, the player is statistically most likely to win 506 times and the dealer 494 times. It's not a big difference, but why would a player choose to lose more often than he wins? Why indeed? Yet, in this situation, most players choose to stand. (As one player said, "it more important to me to avoid the stress of hitting than to gain a small statistical advantage.")

Basic strategy recommendations are usually communicated in the form of a decision table that summarizes complex condition logic in an easy-to-understand format. Here's a sample of basic strategy's conditional logic:

- If the tables rules are X,
  - And there are no aces showing,
    - And there are no pairs showing,

- And the players cards total Y points,
  - And the dealer's up card is worth Z points
- Then <insert recommendation to stand, hit, double, split, or surrender depending on which has the highest expected value>

**The best way to learn basic strategy is with visualization.**

There are three common ways to learn basic strategy. You can:

- Memorize the rules
- Refer to a wallet card at the table
- Learn how to visualize the decision tables

Unless you are a genius with a photographic memory, memorizing all the recommendations for all the possible table rules is going to be difficult to impossible. The best you can hope for is to memorize the rules for hitting and standing, *which is what most players do*.

Instead, we recommend learning how to visualize the entire decision table *for the most popular table rules* and then memorize the small number of recommendations that change with different table rules. We also suggest using a basic strategy wallet card during play to refresh your memory as needed in the learning period.

# The Basic Strategy Decision Table

A basic strategy decision table can be intimidating.

Here's a basic strategy decision table with notes that illustrate how it works:

**WHEN THE RULES ARE**

- Four or more decks
- Dealer hits on soft-17 (ace + 6)
- Double after split to 4 hands
- Dealer peeks for blackjack
- No surrender

If these are the table rules

➔

**DO THIS**

Player has:	Player's Point:	Dealer's Points:										
		2	3	4	5	6	7	8	9	10	11	
No aces or pairs	≤ 8											
	9		D	D	D	D						
	10	D	D	D	D	D	D	D	D			
	11	D	D	D	D	D	D	D	D	D	D	
	12	H		S	S	S						
	13	S	S	S	S	S						
	14	S	S	S	S	S						
	15	S	S	S	S	S						
	16	S	S	S	S	S						
	17	S	S	S	S	S	S	S	S	S	S	
	≥ 18	S	S	S	S	S	S	S	S	S	S	

If the dealer's face-up card has this many points

←

If this is what's in the player's hand

➔

**THEN DO THIS**

Player has:	Dealer's Points:	2	3	4	5	6	7	8	9	10	11
An ace and a...	2	H	H	H	D	D	H	H	H	H	H
	3	H	H	H	D	D	H	H	H	H	H
	4	H	H	D	D	D	H	H	H	H	H
	5	H	D	D	D	D	H	H	H	H	H
	6	H	D	D	D	D	H	H	H	H	H
	7	D	D	D	D	D	S	S	S	S	S
	8	S	S	S	S	S	D	S	S	S	S
	9	S	S	S	S	S	S	S	S	S	S
	10-point	S	S	S	S	S	S	S	S	S	S

If these are the possible recommendations

←

House edge: 0.500%

<b>KEY:</b>	S	H	D	Sp	Su
	Stand	Hit	Double	Split	Surrender

It looks formidable, but once learned, it's easy to use. Let's take an example.

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Suppose the player has an Ace and an eight and the dealer has a six showing. The rows and columns that reflect this are shown with the blue arrows. The recommendation, which is to double, is shown inside the red circle at the intersection of the row and column selected.

**WHEN THE RULES ARE**

Four or more decks  
 Dealer hits soft 17 (ace + 6)  
 Double after split to 4 hands  
 Dealer plays blackjack  
 No surrender

**DO THIS**

Player has:	Player's Points:	Dealer's Points:										
		2	3	4	5	6	7	8	9	10	11	
No aces or pairs	≤ 8	H	H	H	H	H	H	H	H	H	H	
	9	H	D	D	D	D	H	H	H	H	H	
	10	D	D	D	D	D	D	D	H	H	H	
	11	D	D	D	D	D	D	D	D	D	D	
	12	H	H	S	S	S	S	H	H	H	H	
	13	S	S	S	S	S	S	H	H	H	H	
	14	S	S	S	S	S	S	H	H	H	H	
	15	S	S	S	S	S	S	H	H	H	H	
16	S	S	S	S	S	S	H	H	H	H		
17	S	S	S	S	S	S	S	S	S	S		
≥ 18	S	S	S	S	S	S	S	S	S	S		

Player has:	Dealer's Points:	2	3	4	5	6	7	8	9	10	11
An ace and a...	2	H	H	H	D	D	H	H	H	H	H
	3	H	H	H	D	D	H	H	H	H	H
	4	H	H	D	D	D	H	H	H	H	H
	5	H	H	D	D	D	H	H	H	H	H
	6	H	D	D	D	D	H	H	H	H	H
	7	D	D	D	D	D	S	H	H	H	H
	8	S	S	S	S	D	S	S	S	S	S
	9	S	S	S	S	S	S	S	S	S	S
	10-point	S	S	S	S	S	S	S	S	S	S

Player has:	Dealer's Points:	2	3	4	5	6	7	8	9	10	11
A pair of...	2s	Sp	Sp	Sp	Sp	Sp	Sp	H	H	H	H
	3s	Sp	Sp	Sp	Sp	Sp	Sp	H	H	H	H
	4s	H	H	H	Sp	Sp	Sp	H	H	H	H
	5s	D	D	D	D	D	D	D	H	H	H
	6s	Sp	Sp	Sp	Sp	Sp	Sp	H	H	H	H
	7s	Sp	Sp	Sp	Sp	Sp	Sp	H	H	H	H
	8s	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp
	9s	Sp	Sp	Sp	Sp	Sp	S	Sp	Sp	S	S
	10s	S	S	S	S	S	S	S	S	S	S
	Aces	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp

House Edge: 0.060% \*

**KEY:** S Stand H Hit D Double Sp Split Su Surrender

## **Don't try to memorize the basic strategy decision table.**

Typically, a player will try to memorize as many of the recommendations as he can remember then fill in the gaps for those he cannot remember with “educated” guesses, or he will use some popular rule-of-thumb like “always assume the dealer’s hole card (the face-down card) is a 10-point card.” These guesses and rules-of-thumb often lead to the wrong choice, and since every incorrect decision affects the outcome of the blackjack session, especially with the hard-to-remember recommendations, they should be avoided.

The most frequent basic strategy mistake players make is to hit or stand when they should double or split.

## **Use a Wallet Card**

### **Use a wallet card whenever you're unsure of what to do.**

Fortunately, casinos allow players to refer to a wallet card during play. Unfortunately, these cards are hard to read; they address only the most popular table rules; they slow the game; and they mark the player as a neophyte. For these reasons and more, wallet cards are rarely used at blackjack tables.

We think this is a mistake. Players who are learning basic strategy or who need the help of a definitive reference should buy a wallet card and use it, even if only as a backup. Players should also be generally familiar with the card’s content to avoid slowing the game.

### **Some wallet cards accommodate table rule variations.**

The next page contains a wallet card that can be printed and folded as shown in the illustration. It has all the rules that 99.9% of blackjack players are ever going to encounter. Here's how it's used.

The three blocks on the left contain the basic strategy recommendations for the most popular table rules, which are listed across the top-left block. The two top blocks on the right show the basic strategy recommendations that change when the table rules change. The block at the bottom right shows how much of a bankroll is needed to avoid busting for various periods of time and with various table minimums (with 95% confidence).

Rules: Hit S17, No Surr, 4Dks, DAS, Peek											
HARD HAND		Dealer's points (up card)									
Player's	2	3	4	5	6	7	8	9	10	11	
≤8	H	H	H	H	H	H	H	H	H	H	
9	H	D	D	D	D	H	H	H	H	H	
10	D	D	D	D	D	D	D	D	H	H	
11	D	D	D	D	D	D	D	D	D	D	
12	H	H	S	S	S	H	H	H	H	H	
13-16	S	S	S	S	S	H	H	H	H	H	
≥17	S	S	S	S	S	S	S	S	S	S	

SOFT		Dealer's points (up card)									
Player's	2	3	4	5	6	7	8	9	10	11	
A2-A3	H	H	H	D	D	H	H	H	H	H	
A4-A5	H	H	D	D	D	H	H	H	H	H	
A6	H	D	D	D	D	H	H	H	H	H	
A7	D	D	D	D	D	S	S	H	H	H	
A8	S	S	S	S	D	S	S	S	S	S	
A9-A10	S	S	S	S	S	S	S	S	S	S	

PAIR		Dealer's points (up card)									
Player's	2	3	4	5	6	7	8	9	10	11	
2s, 3s	Sp	Sp	Sp	Sp	Sp	Sp	H	H	H	H	
4s	H	H	H	Sp	Sp	H	H	H	H	H	
5s	D	D	D	D	D	D	D	D	H	H	
6s	Sp	Sp	Sp	Sp	Sp	H	H	H	H	H	
7s	Sp	Sp	Sp	Sp	Sp	H	H	H	H	H	
8s	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	
9s	Sp	Sp	Sp	Sp	Sp	S	Sp	Sp	S	S	
10s	S	S	S	S	S	S	S	S	S	S	
Aces	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	

STAND S17		Exceptions Dealer's points (up card)									
Player's	2	3	4	5	6	7	8	9	10	11	
Hard 11	D	D	D	D	D	D	D	D	D	H	
A7	H	D	D	D	D	S	S	H	H	H	
A8	S	S	S	S	H	S	S	S	S	S	

Surrender		Dealer's points (up card)									
Player's	2	3	4	5	6	7	8	9	10	11	
Hard 15	S	S	S	S	S	H	H	H	Su	Su	
Hard 16	S	S	S	S	S	H	H	Su	Su	Su	
Hard 17	S	S	S	S	S	S	S	S	S	Su	
Pair of 8s	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Su	

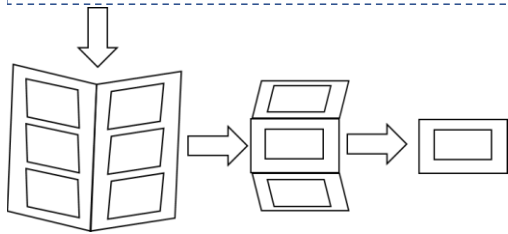
  

Stand S17 & Surrender		Dealer's points (up card)									
Player's	2	3	4	5	6	7	8	9	10	11	
Hard 11	D	D	D	D	D	D	D	D	D	H	
Hard 15	S	S	S	S	S	H	H	H	Su	Su	
Hard 16	S	S	S	S	S	H	H	Su	Su	H	
A7	H	D	D	D	D	S	S	H	H	H	

BLACKJACK TRUTH - 99.9% Wallet Card										
BANKROLL REQUIRED										
Play Hours	Average Bet									
	\$5	\$10	\$15	\$20	\$25					
1	\$86	\$173	\$259	\$346	\$432					
2	\$123	\$246	\$369	\$492	\$615					
3	\$151	\$303	\$454	\$606	\$757					
4	\$176	\$351	\$527	\$702	\$878					
5	\$197	\$394	\$591	\$788	\$985					
6	\$217	\$433	\$650	\$866	\$1,083					

Assumes 55 hands/hr, .5% edge; no errors; 95% confidence





## How to Visualize the Decision Table

*All the visualization aids discussed in this section sound complicated when described with words. They are much easier to see and recall when viewed in the diagrams.*

*Also note that except for certain oddball cases, which are described, players should always hit when outside the row-range for doubling and splitting. This is also clear in the diagrams.*

*Don't be intimidated trying to visualize the entire basic strategy decision table. Eventually, you will remember the blocks, cues, filters and other memory aids and through them remember the specific basic strategy recommendations.*

### **Most casinos use the same table rules.**

These table rules are:

- Dealer hits on soft 17
- No surrender
- Players can double after splitting
- Four or more decks
- Dealer “peeks” before play starts  
(In the American version of the game, the dealer peaks [checks the value of his face-down card] when he has an ace or a ten showing to let the table know he does or doesn't have blackjack.)

The three most likely exceptions to these table rules are:

- Dealer stands on soft 17
- Surrender
- Both of the above

That's it. Although there are thousands of other rules and combinations of rules in blackjack, these are all the only rules and exceptions that most players will ever encounter in a traditional blackjack game.

**Visualization employs a number of blackjack standards.**

Before discussing the visualization techniques, we need to understand several blackjack conventions.

Players make five kinds of decisions for each hand: stand, hit, double, split, and surrender.

There are large sections of the basic strategy decision table, called "blocks," that have the same recommendation.

Some sections of the decision table take on distinctive shapes that can be used as memory "cues," and some sections can be "filtered" to make visualization easier.

A small number of rows in the decision tables are too random to fit into any rules base. These are called "oddballs."

A "soft hand" is one with an ace (which can be one or 11 points...thus making the hand soft). A "pair" is a hand with two cards of the same point value. A "hard hand" is one without any aces or pairs

**"Blocks" sometimes have obvious recommendation.**

The recommendations for some blocks are easy to remember because any other action would be obviously wrong. For example, the player should always:

- Hit with a hard 8 or less as there's no chance of busting
- Stand with a hard 17 as there's a high chance of busting
- Stand with a soft 20 (ace + 9) as 20 is usually a winner

Even the newest blackjack player learns these blocks quickly.

**Other “blocks” have clear dividing lines.**

Like, when the *player* has a hard 13 through 16...

- Hit when the *dealer* has 7 or more
- Stand when the *dealer* has 6 or less

**While other “blocks” (rows) have a simple rule.**

Always:

- Split ace and 8 pairs

These blocks rules are illustrated in the following chart.

Player has:	Player's Points:	Dealer's Points:										
		2	3	4	5	6	7	8	9	10	11	
No aces or pairs	≤ 8	H	H	H	H	H	H	H	H	H	H	→ Hit
	9											
	10											
	11											
	12											
	13	S	S	S	S	S	H	H	H	H	H	→ Hit
	14	S	S	S	S	S	H	H	H	H	H	→ Hit
	15	S	S	S	S	S	H	H	H	H	H	→ Hit
	16	S	S	S	S	S	H	H	H	H	H	→ Hit
	17	S	S	S	S	S	S	S	S	S	S	→ Stand
	≥ 18	S	S	S	S	S	S	S	S	S	S	→ Stand

Player has:	Player's Points:	Dealer's Points:										
		2	3	4	5	6	7	8	9	10	11	
An ace and a...	2											
	3											
	4											
	5											
	6											
	7											
	8											
	9	S	S	S	S	S	S	S	S	S	S	→ Stand
10-point	10-point	S	S	S	S	S	S	S	S	S	S	→ Stand

Player has:	Player's Points:	Dealer's Points:										
		2	3	4	5	6	7	8	9	10	11	
A pair of...	2s											
	3s											
	4s											
	5s											
	6s											
	7s											
	8s	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	→ Split
	9s											
	10s											
Aces	Aces	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	→ Split

## Cues help us remember when to “double.”

Doubling is more complicated than hitting and standing using a block. However, there are two cues that can help players visualize when to double -- the “up escalator for aces” cue and the “down escalator for hard hands” cue.

The “up escalator for aces” cue occurs when the player has an ace+2 (3 or 13 points) through an Ace+7 (8 or 18 points)

The “down escalator for hard hands” cue occurs when the player has a hard 9 through a hard 11.

The last cue is really not a cue, it’s a rule: the player should always double a hard 10 when the dealer has less than 10. (This is also true for a pair of fives but not true for a soft 20 [an ace+9] which is explained later.)

Player has:	Player's Points:	Dealer's Points:									
	2	3	4	5	6	7	8	9	10	11	
No aces or pairs	≤ 8										
	9	H	D	D	D	D	H	H	H	H	H
	10	D	D	D	D	D	D	D	D	H	H
	11	D	D	D	D	D	D	D	D	D	D
	12										
	13										
14											
15											
16											
17											
≥ 18											

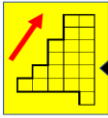
  

Player has:	Dealer's Points:									
2	3	4	5	6	7	8	9	10	11	
An ace and a...	2	H	H	H	D	D	H	H	H	H
	3	H	H	H	D	D	H	H	H	H
	4	H	H	D	D	D	H	H	H	H
	5	H	H	D	D	D	H	H	H	H
	6	H	D	D	D	D	H	H	H	H
7	D	D	D	D	D					
8					D					
9										
10-point										

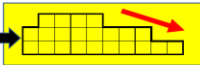
  

A pair of...	Dealer's Points:									
2s	3	4	5	6	7	8	9	10	11	
2s										
3s										
4s										
5s	D	D	D	D	D	D	D	D	D	D
6s										
7s										
8s										
9s										
10s										
Aces										



Cue: Up escalator for hard hand



Cue: Down escalator for hard hand

Always double 10 (pair or hard hand) when dealer has a 9 or less

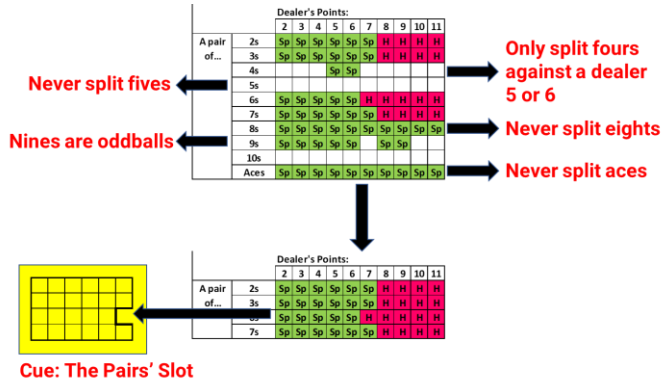
## Filtering can help us remember when to “split.”

Splitting pairs is also complicated, but we can make it easier by removing the:

- 4s...only split against a dealer’s 5 or 6
- 5s...follow the doubling rules for a hard 10
- 8s and aces...which are always split
- 9s...an oddball with special oddball rules

Which leaves us with pairs of 2s, 3s, 6s, and 7s. For these, we can use the “pairs’ slot” cue, which calls for the player to:

- Split 2s, 3s, and 7s when the dealer has 7 or less
- Split 6s when the dealer has 6 or less



## Some “oddball” rows don’t follow any patterns.

These must be memorized.

The oddballs are also a good example of when the player might want to refer to his wallet card.

Player has:	Player's Points:	Dealer's Points:										
		2	3	4	5	6	7	8	9	10	11	
No aces or pairs	≤ 8											→ <b>Hard 12</b>
	9											
	10											
	11											
	12	H	H	S	S	S	H	H	H	H	H	
	13											
	14											
	15											
16												
17												
≥ 18												

Player has:	Player's Points:	Dealer's Points:										
		2	3	4	5	6	7	8	9	10	11	
An ace and a...	2											→ <b>Soft 18</b> → <b>Soft 19</b>
	3											
	4											
	5											
	6											
	7	D	D	D	D	D	S	S	H	H	H	
	8	S	S	S	S	S	D	S	S	S	S	
	9											
	10-point											

Player has:	Player's Points:	Dealer's Points:										
		2	3	4	5	6	7	8	9	10	11	
A pair of...	2s											→ <b>Pair of nines</b>
	3s											
	4s											
	5s											
	6s											
	7s											
	8s											
	9s	Sp	Sp	Sp	Sp	Sp	S	Sp	Sp	S	S	
	10s											
	Aces											

Note that when the player has a soft 19 (an ace+8, 19 points) and the dealer has a six, the player should double. This will raise eyebrows around the table but ignore them. As strange as it looks, the odds favor doubling here rather than standing.

Also note that it's tempting to forget about these four oddball rows altogether. After all, they are hard to remember, and how often are they going to show up? Don't do it though. Some of them involve doubling and splitting, which can have a significant impact on the final win-loss outcome.

## Follow the same rules for >2 cards

### Use visualization rules with more than two cards.

The player should use the same basic strategy recommendations discussed thus far also when he has more than two cards *with the following exceptions*:

- **Hit when the decision chart says to double**  
(There's no doubling with more than two cards.)
- **Stand with a soft 18**  
(When the player has a soft 18 with more than two cards, the specific makeup of the cards determines the exact recommendation. However, the difference in expected value is so small between these different combinations, and the incidence is so rare that the recommendations are not worth remembering.)
- **Consider all pairs as hard hands**  
(There's no splitting with more than two cards.)



# PLAY WITH AN ADEQUATE BANKROLL

## Needed to Win

- Don't make sucker bets
- Learn basic strategy
- **YOU'RE HERE...Play with an adequate bankroll**
- Have an exit plan
- Don't hedge when you're losing

## **Players need an adequate bankroll to weather dips.**

Another reason players lose is they come to the table with an insufficient bankroll to survive the normal dips in the game's win-loss cycle.

## **Have a bankroll that's 33 times your average bet.**

There is a complicated statistical formula (described in "The Details" section) for estimating the maximum loss that can also be used to estimate the bankroll needed for a blackjack session, but it's unlikely that any recreational player will ever use it. A more practical solution is to use the "Rule of 33."

The "Rule of 33" is a rule of thumb that tells the player the bankroll (cash) necessary to have a 95% chance of not going broke (busting) in a three-hour blackjack session. To use it, the player simply multiplies the average bet he expects to make by 33. For example, if you are going to bet \$10 on average, bring \$330 to the table; for \$15 bets, bring \$495; for \$20 bets, bring \$660; and so on.

Just one caution...the Rule of 33 is an estimate based on three hours of play. It is less accurate for longer sessions, where the player should refer to the following table, which is also found on the universal

wallet card shown in the “Learn Basic Strategy” section.

BANKROLL REQUIRED TO AVOID GOING BROKE					
Play	Average Bet				
Hours	\$5	\$10	\$15	\$20	\$25
1	\$86	\$173	\$259	\$346	\$432
2	\$123	\$246	\$369	\$492	\$615
3	\$151	\$303	\$454	\$606	\$757
4	\$176	\$351	\$527	\$702	\$878
5	\$197	\$394	\$591	\$788	\$985
6	\$217	\$433	\$650	\$866	\$1,083

Assumes 55 hands/hr, .5% edge; no errors; 95% confidence

Note the card assumes that the player makes no basic strategy errors.

### **Theoretically, bankroll size should not matter.**

Statistically, having an inadequate bankroll should not matter as the number of times the player sits down to play the game is irrelevant to his long-term results.

As a practical matter, however, if a player loses all the time because he doesn't bring enough cash to the table, it's likely that he is not going to play very often. This will reduce his chance of offsetting his frequent losses with the big wins needed to achieve statistical balance.

More importantly, our goal of having fun by winning as often as we lose is not going to happen if the player loses all the time. A much better approach is to come to the table with enough money to weather the dips.

# HAVE AN EXIT PLAN

## Needed to Win

- Don't make sucker bets
- Learn basic strategy
- Play with an adequate bankroll
- **YOU'RE HERE...Have an exit plan**
- Don't hedge when you're losing

## **Have a personal profit goal that defines a win for you.**

Another “soft” reason players lose is they don't know when to quit. Instead of leaving the table when they reach their profit goal, they leave when they lose, when they're tired, when they have another commitment, or when the casino is empty.

## **The Rule of 33 works here as well to create a target.**

Again, the player can use a complicated statistical formula for determining the probability of achieving a maximum profit (discussed in “The Details” section), or simply use the “Rule of 33” (multiply the average bet by 33).

We suggest that this number, which represents the very top of the most-likely win-loss range, is a good milestone for “when to leave.” Sure, it's possible to win more, and yes, it's hard to walk away when you're winning, but a player who wants to win as often as he loses needs to have standards. And this is one of the most sensible.

As with the required bankroll, the “Rule of 33” works best for a three-hour blackjack session. It is less accurate for longer sessions. In these cases, refer to the following table:

PROFIT TARGET					
Play	Average Bet				
Hours	\$5	\$10	\$15	\$20	\$25
1	\$84	\$167	\$251	\$335	\$418
2	\$118	\$235	\$353	\$470	\$588
3	\$143	\$286	\$429	\$573	\$716
4	\$165	\$329	\$494	\$658	\$823
5	\$183	\$367	\$550	\$733	\$916
6	\$200	\$400	\$600	\$800	\$1,000

Assumes 55 hands/hr, .5% edge; 1.5% player errors; 95% co

Note the card assumes that the player makes no basic strategy errors.

### **Theoretically, profit target should not matter.**

Again, theoretically, when the player leaves the table should not matter. As a practical matter, however, most players who lose frequently are not going to play often enough to achieve this long-term statistical result. What is much more likely is that this player will leave often as a loser, get discouraged, and play less frequently (not more), making it even more difficult to reach breakeven.

More importantly, our goal of winning as often as we lose is never going to happen. A better approach is to have a profit target and leave the session when this target is hit.

# DON'T HEDGE WHEN YOU'RE LOSING

## Needed to Win

- Don't make sucker bets
- Learn basic strategy
- Play with an adequate bankroll
- Have an exit plan
- **YOU'RE HERE...Don't hedge when you're losing**

## **Failing to double or split when losing is a bad decision.**

Doubling and splitting are the biggest moneymakers for the player as they allow the player to multiply his bet when the odds are in his favor. However, it's damned hard for a player to double and split when he's in an epic losing streak. What's much more likely is that the player will hunker down and play conservatively...hedging his bets. This is the worst possible decision; this is precisely the time when the player should bet the farm, not hedge.

Luck has no will and no memory. Squandering a rare advantage by failing to make a bet or by betting less than the maximum is a huge mistake, *one that most players make all the time.*

## **Ignore streaks.**

But let's get real, most players, even the most experienced, believe in streaks and betting against a streak is hard if not impossible.

We just find it hard to accept randomness; we want to believe that something or someone is controlling the cards. For example, if someone flips a coin and gets heads a hundred times in a row, aren't many of us certain that the next toss is going to be tails...or heads? This certainty is our undoing...the next toss

of the coin has exactly the same probability as the first, 50-50.

This belief that the past affects the future is called the Gambler's Fallacy.

### **Always bet the maximum when you have the advantage.**

Players who want to win at blackjack need to play by the odds even if they don't believe in them. For instance, by betting the maximum when basic strategy calls for them to double or split even in the face of a disastrous losing streak. Failure to do so only continues or worsens their situation.

### **The dealer wins more often than the player.**

Another thing that contributes to a player's desire to hunker-down is the truism that the dealer wins more often than the player. This is because the game's rules -- such as the dealer playing after the player -- favor the dealer winning more hands than the player. This is offset by the fact that the player wins larger bets than the dealer. For example, players can win big with blackjack, doubling, and splitting, and lose less with surrender.

Don't let this built-in imbalance affect the way you play.

### **Be patient and brave.**

Given these realities, players must be brave, have patience, and most of all, they must follow the basic strategy recommendations.

## CONCLUSION

That's it. If you follow these five suggestions...

- Don't make sucker bets
- Learn basic strategy
- Play with an adequate bankroll
- Have an exit plan
- Don't hedge when you're losing

...You will win your fair share of blackjack sessions and have fun doing it.

What exactly does it mean though to "win your fair share?"

We define it as winning half the blackjack "sit-down sessions" you play. With a house edge of only 0.5%, this is entirely possible. We also think that a big part of the fun is to occasionally win BIG, which is also very doable.

Some players like to think of winning in terms of profits and losses. Unfortunately, the longer you play, the more likely it is that there will be that your losses will exceed your profits. Theoretically, overtime everyone would breakeven less the amount lost due to the house edge and the player's basic strategy handicap. For example, if a player plays 10 three-hour sessions a year with an average bet of \$20, in ten years, this player will have bet a total of about \$330,000. If the house edge is 0.5%, the casino's take will be about \$1,650; if the player's handicap is 1%, his losses will be about \$3,300, netting him a total loss of \$4,950 or \$495 a year. Again, not a bad deal for 300 hours of entertainment.

Of course, if this player plays like the average blackjack player in Nevada, his losses will be 14% of \$330,000, or \$46,200...almost ten times more than the \$4,950!

Good luck.





# THE DETAILS

The following sections explain the game in more detail, provide some essential context, and substantiate the recommendations. It's organized into the following sections.

- Rules of the Game
- Math Used in Blackjack
- Applying Math to Blackjack
- Basic Strategy Minutia
- More on the House Edge
- Advice and Opinion



# RULES OF THE GAME

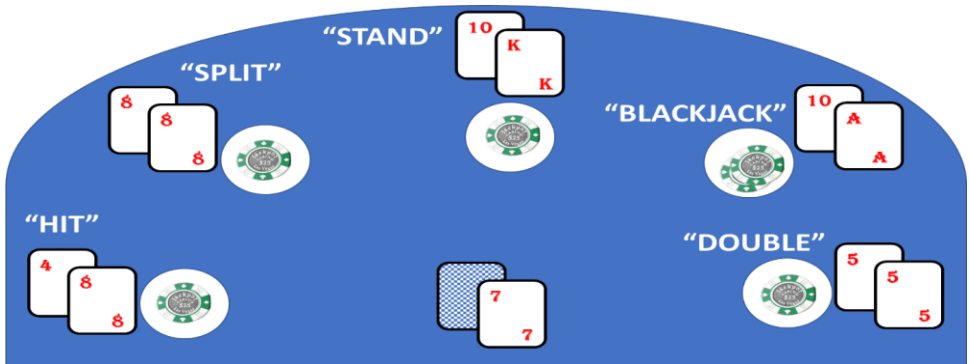
These are the rules for the American, multi-deck, blackjack game, which is played in most casinos around the world.

*[The rules for the European game are different. In the European game, the dealer gets one up card at the beginning of play and a second card only after all players have completed their play. This changes the dynamics of the player's game with respect to blackjack, even money, insurance, peeking, and surrender.]*

## In Summary

Blackjack is a card game between a player and a dealer, who represents the casino. Players do not compete against each other, instead they make individual decisions to bet and to hit, stand, double, split, or surrender depending on the cards they can see. The dealer can only hit or stand in accordance with the table's rules (e.g. sometimes the dealer must stand on soft 17).

In the American game, the dealer gives each player two cards, both face-up, and gives himself one card face-up (the up card) and one card face-down (the hole card) as illustrated below.



The player must have more points in his hand than the dealer without exceeding 21 points to win. When he wins the player takes back his bet and receives one like chip for every chip he has bet.

Points are determined by the card's rank as shown below.

Aces = 1 or 11 points (at the player's choice)

Picture cards and tens = 10 points

All other cards = the card's face value (2, 3, 4...)

Player earn points by choosing to:

Keep the first two cards (**stand**)

Get another card (**hit**)

Double the bet (**double**)

Separate the pair into two hands (**split**), or

Give up the hand (**surrender**)

If the player has blackjack (21 points in his first two cards), the dealer immediately pays him three like chips for every two he has bet, or some other premium blackjack ratio like six chips for every five, depending on the table's rules.

After each player has made his decision to stand, hit, double, split, or surrender, the dealer turns over his hole card and either hits or stands depending on his cards. Typically, the

dealer stands if he has 17 points or more and hits if he has 16 points or less. If a player or the dealer hits and his resulting point total is more than 21 points, he loses (busts). If the dealer busts, all players who have not busted win.

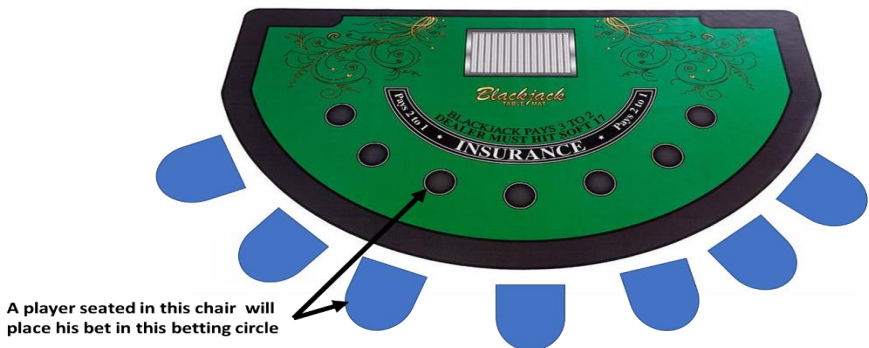
If the player has blackjack and the dealer's up card is an ace, the dealer will offer the player "even money" -- a one-for-one (1:1) payoff rather than the 3:2 or 6:5 payoff normal for blackjack.

If the player does not have blackjack and the dealer up card is an ace, the dealer will offer the player "insurance." The insurance bet, which is up to one-half of his original bet, pays 2:1. This allows the player to break even if he loses his original bet to a dealer's blackjack.

## In Detail

Let's go over this process again in more detail.

To join the blackjack game, the player takes an empty seat at the table.



To get chips, the player puts his cash on the table on the player's side of the betting circle. The dealer will exchange

his cash for chips of an appropriate denomination as soon as play allows.

The chips used for betting are usually a standard color that designates their value:

White	= \$1	Pink	= \$250
Red	= \$5	Purple	= \$500
Green	= \$25	Yellow	= \$1,000
Orange	= \$50	Lt. Blue	= \$2,000
Black	= \$100	Brown	= \$5,000

Every blackjack table has a sign or imprint on the table's felt that gives the table's...

Minimum Bet	The lowest bet amount permitted
Maximum Bet	The highest original-bet amount permitted
Blackjack Payoff	The payoff for blackjack (e.g., 3:2, 6:5)
Hit/Stand Rule	When the dealer must hit (Usually, the dealer hits with 16 or less and with soft-17, an ace and a 6.)

In more formal settings, a player should wait for the cards in the "shoe" to finish or ask the other players if they object to him joining the game mid-shoe. Most of the time, the other players will welcome a new player. (The shoe is the long box that holds multiple decks of cards for the dealer; so called because it resembles a woman's high-heel shoe.)

The player places his bet inside the betting circle before the dealer starts to deal the hand.

The object of the game is to beat the dealer. This is done by having more points than the dealer without going over 21 points and busting.

*[The object is not to get 21 points, to get close to 21 points, or to avoid busting, it is to beat the dealer. Many players, even experienced ones, reduce their*

*chance of winning by chasing the 21-point target when it's not necessary to win.]*

The dealer takes the first card from the new shoe -- sometimes showing it to the players, sometimes not -- and places (burns) it in the discard tray.

*[This tradition is followed to prevent "steering" which occurs when the dealer cheats and deals an illegal card from the top of the shoe.]*

The dealer then deals the next card in the shoe to the first player on his left and continues around the table from his left to his right giving each player and himself a card until everyone has two cards.

*[Casinos teach dealers to deal cards to the chips in the betting circle rather than to the players sitting at the table. This prevents the dealer from accidentally dealing cards to a player who has forgotten to place his bet or who wants to sit out a hand.]*

### *Preliminary Play for Blackjack, Insurance, and Even Money*

When the initial deal is finished, the dealer assesses all the hands at the table and completes several actions depending on the cards.

- The dealer pays any player with blackjack the blackjack payoff (3:2 or 6:5) if his up card is not an ace.
- If the dealer's up card is an ace, he offers any player with blackjack even money (a 1-for-1 payoff) and immediately pays those who accept.
- The dealer offers insurance to any player who does not have blackjack if his up card is an ace.

Any player who wants insurance places as much as one-half of his original bet on the table's insurance line.

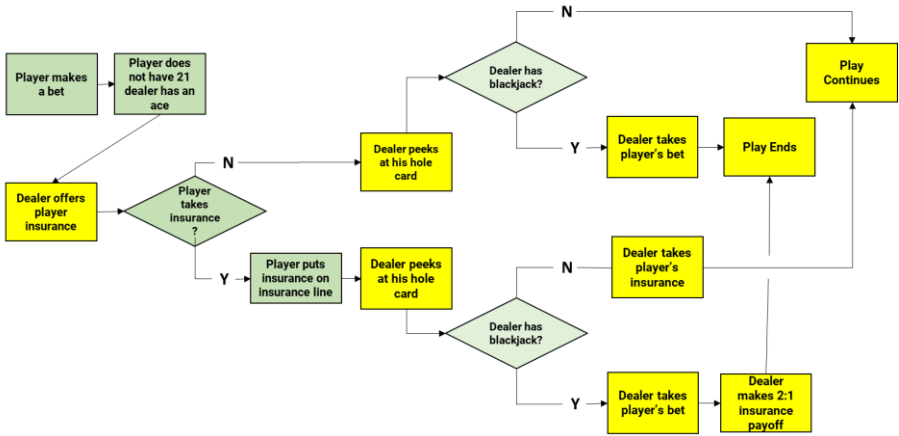
Once these transactions are finished, if the dealer's up card is an ace or a 10-point card, the dealer looks at (peeks) at his hole card to check for blackjack.

- If the dealer's hole card is a 10-point card and he does have blackjack,
  - He pushes back the original bet of any player who has blackjack and who refused even money
  - He pays \$2 for every \$1 for the insurance bets on the table's insurance line
  - He takes the original bet of the other players
  - Play ends
- If the dealer's hole card is not a 10-point cards (no blackjack),
  - He announces that he does not have blackjack
  - He takes all insurance bets
  - He pays the blackjack payoff (3:2 or 6:5) to any player who has blackjack and had declined even money

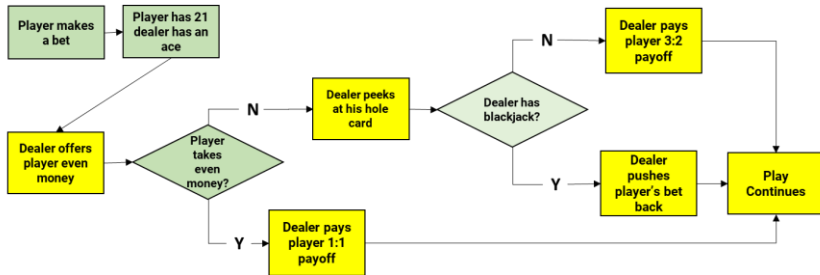
For those who prefer pictures to words, this process for dealing with blackjack, peeking, even money, and insurance (what we have called "Preliminary Play") is repeated in the two flow charts that follow.



**INSURANCE ... Situation: The dealer's up card is an ace; the player does not have blackjack**



**EVEN MONEY ... Situation: The dealer's up card is an ace; the player has blackjack**



There are no standard hand signals to accept or reject even money or insurance. Most players just nod or shake their heads and, sometimes, confirm their choice with a verbal yes or no.

The dealer will always ask each player with blackjack if he wants even money. The dealer will always announce that “insurance is open” and, after a few seconds, “insurance is closed” to the table at large.

*[Many players don't know these rules for peeking, insurance, and even money and they don't care. They simply follow the dealer's lead and make the choices*

*that seem appropriate during the preliminary play process.]*

This is the end of “Preliminary Play” and the start of “Mainstream Play.”

### *Mainstream Play*

Once all the blackjack, insurance, and even money transactions are finished, the dealer asks the player on his far left what he wants to do -- stand, hit, double, split, or surrender. The player makes his decision based on the point value of his hand and the dealer’s up card, hopefully using the basic strategy recommendations. The following paragraphs describe these five player decisions.

#### **STAND...**

**“I don’t want any more cards.”**

Signal

The player waves his flat hand horizontally over his cards.

Dealer’s Action

The dealer moves to the next player.

Comment

It is often hard for the dealer to discern the stand signal from the hit signal, which can lead to major problems like the dealer dealing the next card to the next player when the current player wanted a hit. To avoid this, dealers will often confirm the player’s decision when the player’s hand signal is unclear or when the player’s decision is unusual, *but not always*. Be sure to signal clearly.

#### **HIT...**

**“I want another card.”**

Signal

The player points at his cards or taps the table.

Dealer's Action The dealer gives the player another face-up card then ask for the next choice if the player is under 21 points. A player can continue to hit until he makes the decision to stand, or until he busts.

Comment If a player hits and busts, the dealer takes the player's bet, puts his chips in his chip tray, takes the player's cards, and puts them in the discard (burn) pile.

**DOUBLE...** **"I want to double my bet and get one more card."**

Signal The player places chips equal to his original bet or less (called double-for-less) just behind his first bet and holds up one finger, indicating he wants one more card.

Dealer's Action The dealer deals the player one card. If the card causes the player to bust, he loses both his original bet and his double bet. After dealing the one card, the dealer moves to the next player.

Comment Some table rules allow players to double only when the player's hand has a specific point value (e.g., 10 or 11), most, however, have no restriction on doubling.

**SPLIT...** **"I want to split this pair and place another equal bet on the new hand."**

Signal The player places a bet equal to his original bet beside his original bet and holds up two fingers indicating that he wants two cards, one for each new hand.

Dealer's Action The dealer separates the player's two cards and his two bets to create two new

hands; he then deals a card to the first new hand and asks the player for his decision on this hand. The player has all the same options he has with any initial hand (hit, stand, double, split, or surrender). If the player's decision causes him to bust, he loses his bet for this hand. The dealer moves to his second hand of the split pair once the player has finished. If the player receives another pair on any split hand, he may split again and the process repeats.

Comment

A pair is two cards of the same rank (e.g., two eights) and at most casinos, any two 10-point cards (e.g., a ten and a jack). Usually, table rules limit a player to splitting three times for a total of four hands and four bets. Players can hit, stand, double, re-split, or surrender for each new hand except when the original pair is aces. If a player splits aces, the dealer will deal him one and only one card for each split ace. Table rules do not typically allow re-splitting aces nor do table rules allow the premium blackjack payoff of 3:2 or 6:5 on 21 points after splitting aces.

### **SURRENDER...**

**“I want to stop playing and surrender half of my original bet.”**

Signal:

The player says “surrender” and/or runs his hand in a straight line behind and perpendicular to his cards.

Dealer's Action:

The dealer takes the player's cards, removes half of the player's original bet, and pushes back the other half.

Comment:

Surrender comes in two flavors -- early

and late. Early surrender happens before the dealer checks for blackjack by peeking. This is rare nowadays, which is why early surrender is not included with the description of even money, insurance, and peeking. Late surrender, which happens after the dealer peeks at his hole card and announces that he does or does not have blackjack, is also rare but much more likely than its early-surrender cousin. Casinos do not typically allow early or late surrender at low-minimum blackjack tables.

Once the first player has finished, the play moves on to the next player and the process repeats.

When the last player has finished, the dealer turns over his hole card and either hits or stands depending on the table's rules. If he hits and busts, all the players who have not busted win.

The dealer pays any player who is closer to 21 than he one like chip for every chip in the player's original bet, leaving both the payoff and the player's original bet in the betting circle for the player to collect. The dealer returns, without any payoff, any player's original bet where the player's and dealer's points are equal (a tie, called a push). The dealer takes the bets of those players who have fewer points than he does.

The dealer adds all the cards played to the discard tray (the burn pile) and the play continues until the dealer reaches the cut-card (a plastic marker the same size as the cards) in the shoe. He continues to deal this final hand to the remaining players then he shuffles the cards.

In some casinos, the dealer puts the cards in the discard tray to the ASM (Automatic Shuffling Machine). Other casinos use CSMs (Continuous Shuffling Machines), where the dealer continuously adds cards to the shuffling machine which is continuously shuffling.

To leave the game, the player pushes his chips forward and waits for the dealer to exchange his chips for higher denominations chips (called color up or coloring up). The player can hold these chips for later or redeem them for cash at the cashier window.

## *Blackjack-like Games*

Most casinos offer other games that are like the traditional blackjack. Here's a sampling.

2-Face Blackjack	Instant 18
21 Bet	Lucky 13s Blackjack
Burn Blackjack	Lucky Blackjack
21 to the River	Lucky Cat Blackjack
Australian Blackjack	Lucky Stiff BJ
Blackjack Burnout	Mega Blackjack
Blackjack Challenge	No Bust 21
Blackjack Party	One Up
Blackjack Plus	Open 21
Blackjack Switch	Pick One 21
Blackjack X-Change	Player's Choice 21
Block Pro Blackjack	Player's Edge 21
Buffalo Blackjack	Pontoon
Burn 20 Blackjack	Power blackjack
California No Bust	Rummy
Canal 21	Sette e Mezzo
Caribbean 21	Siete y Media
Caribbean Blackjack	Space Jack
Cash Queens	Spanish 21
Change It 21	Super Fun 21
Deal or No Deal	Three Card BJ
Diamond Blackjack	Three Way Action
Double Attack	Ties Win Blackjack
Double Blackjack	Total Bust Blackjack
Double Exposure	Triple Attack BJ
Double Twist BJ	Triple Shot
Double Up Blackjack	Triple Up 21
Doublet blackjack	Twin Blackjack
Down Under BJ	Twisted 21
Easy Jack	U-Turn Blackjack
European Blackjack	Ultimate 21
Exchange Blackjack	War Blackjack
Extreme 21	Your Way 21
Free Bet Blackjack	Zappit
Golden 21	Zombie Blackjack

Here's a brief description of the most popular.

### ***European blackjack***

As expected, this version of blackjack is played in Europe. In this game, there is no dealer hole card. The dealer takes his second card after the players have made their decisions, which means the players don't know if the dealer has blackjack until after they have played their hand. Also, the European rules typically do not allow the player to split fours, fives, or 10-point cards.

### ***Spanish 21***

One of the most popular blackjack-like games is Spanish 21, also called Pontoon, Pirate 21, and Blackjack Exchange. In this game, the casino removes the tens from the deck and compensates by giving the player several favorable table rules not normally found in the traditional game such as surrender, re-splitting aces, player's-blackjack-on-21-always-wins, and double on any number of cards.

### ***Blackjack Switch***

Blackjack Switch allows the player to bet two hands and to switch the second card dealt to these two hands. To compensate, a dealer's 22 results in a push against all hands and the blackjack payoff is always even money (1:1).

### ***Super Fun 21***

Super Fun 21 uses most of the traditional blackjack rules except a player's natural blackjack always beats the dealer's natural blackjack and pays even money (1:1) A diamond blackjack (an ace of diamonds and a 10, jack, queen, or king of diamonds) gets a 2-for-1 payoff.



Lots of people play these blackjack variants because they like the rules they offer. The problem is that it's rare to find basic strategy recommendations for these games. Consequently, most people make their play decisions based on a combination of the traditional game's recommendations and instinct, which makes winning consistently problematic.



# BASIC STRATEGY

Unlike other table games, Blackjack gives players an opportunity to win more often by making the “right” decision at the “right” time to stand, hit, double, split, or surrender. By “right” we mean the decision with the highest probability of winning the hand.

This is determined by probability analysis based on the following variables:

- Is there an ace (a soft hand) or a pair in the initial deal (the first two cards)?
- What’s the point value of the player’s cards after the initial deal?
- What’s the point value of the player’s cards when he has three or more cards?
- Is the dealer’s up card an ace?
- What’s the point value of the dealer’s up card?
- What table rules are in effect?

The basic strategy analysis uses the answers to determine the probability of all possible outcomes then recommends the outcome that gives the player the best chance of winning the hand. If the player follows these recommendations to the letter, the only advantage the casino has is the  $\frac{1}{2}$  of 1% edge provided by the games rules. This means that the probability of the player winning the session are almost even (49.5% to be exact).

So, it’s a simple choice -- use basic strategy if you want to win at blackjack.

Unfortunately, it’s not so easy -- the basic strategy recommendations are hard to learn and remember. This

section presents two practical solutions to address this: using a wallet card and visualization.

**A player must use basic strategy to win at blackjack.**

## What is Basic Strategy?

Before discussing solutions, however, let's understand more about basic strategy.

All casino games have associated mathematical probabilities. The probability of hitting a number in roulette, for example, is one out of 38 or 3% since there are 38 numbers on the wheel. The probability of rolling a seven or an 11 in craps is 8 out of 36 or 22% since there are eight ways to get a seven or an 11. The probability of receiving a 10-point card in blackjack is 16 out of 52 or 31% since there are sixteen 10-point cards in every deck of 52 cards (4 tens, 4 jacks, 4 queens, and 4 kings).

“Basic strategy” uses these probabilities (and all the variable conditions) to determine which action -- to stand, hit, double, split, and surrender -- has the best chance of winning the hand. To do this, it uses a complex mathematical model that has been proven valid by experts and by the computer simulation of millions of hands.

### *The Predictive Model's Process and Logic*

The following diagram contains a high-level, representative description of the process the basic-strategy model uses to arrive at a recommendation.

For each set of table rules:

How many cards in the shoe?

What cards does the player have?

What cards does the dealer have?

Assume the player **STANDS**.

What is the probability of the player **LOSING**?

What **point total** will cause the player to lose?

What **card combinations** produce this point total?

What's the **probability** of each combination occurring?

What's the **probability** that one of these will occur?

What is the probability of the player **PUSHING**?

Repeat Group 1 for pushing.

What is the probability of the player **WINNING**?

Repeat Group 1 for winning.

What's the players **EXPECTED VALUE** from standing?

Assume the player **HITS**.

Repeat Group 2 for hits.

Assume the player **DOUBLES**.

Repeat Group 2 for doubles.

Assume the player **SPLITS**.

Repeat Group 2 for splits.

Assume the player **SURRENDERS**.

Repeat Group 2 for surrenders.

What action – to hit, stand, double, split, surrender – has the highest **EXPECTED VALUE**?

Make this action the basic strategy recommendation.

Repeat Group 3 for all possible cards the dealer could have

Repeat Group 4 for all possible cards the player could have

Yes, it's complicated, but the essence of it is to calculate the Expected Value (EV) for each possible player action (hit, stand...) given a specific set of variable values and game rules. The action with the highest EV is then recommended.

This might be easier to see by following a representative sample of basic strategy logic. Here, the situation is that the player has a hard 20 and the dealer's up card is a 10-point card.

If there are four decks (208 cards) in the shoe,

And the player has a **hard 20 (10+10)**,

And the dealer's **up card is a 10-point card**,

And the player chooses to **STAND**.

What's the probability of the player **LOSING**?

What point total and card combination results in the player losing?

11 with 2+2+2+5 and 11 with 2+3+1+5 and ...

11 with 5+6

What's the probability of each of these occurring?

$\text{Pr}(11 \text{ with } 2+2+2+5) = \text{Pr}(2) \text{ times } \text{Pr}(2) \text{ times } \text{Pr}(2) \text{ times } \text{Pr}(5)$

$\text{Pr}(11 \text{ with } 2+2+2+5) = 16/201 \times$

$16/201 \times 16/201 \times 16/201 = 0.006336,$

$$\begin{aligned} \text{Pr (11 with 2+3+1+5)} &= 16/201 \times \\ 16/201 \times 16/201 \times 16/201 &= 0.006336 \end{aligned}$$

...

$$\begin{aligned} \text{Pr (11 with 5+6)} &= 16/201 \times \\ 16/201 &= 0.079601 \end{aligned}$$

What's the probability that one of these combinations will occur?

Pr [11] = Pr (11 with 2+2+2+5) plus  
Pr (11 with 2+3+1+5) plus ... Pr (11  
with 5+6)

$$\begin{aligned} \text{Pr (11)} &= 0.006336 + 0.006336 + \dots \\ 0.079601 &= 0.125000^* \end{aligned}$$

What's the probability of the player **PUSHING?**

What point total and card combination results in the player pushing?

10 with 2+2+2+4 and 10 with 2+3+1+4 and ...  
10 with 5+5

What's the probability of each of these combinations occurring?

$$\begin{aligned} \text{Pr (10 with 2+2+2+4)} &= 16/201 \times \\ 16/201 \times 16/201 \times 16/201 &= 0.006336, \\ \text{Pr [10 with 2+3+1+4]} &= 16/201 \times \\ 16/201 \times 16/201 \times 16/201 &= 0.006336 \end{aligned}$$

...

$$\begin{aligned} \text{Pr (10 with 5+5)} &= 16/201 \times 16/201 = \\ 0.079601 \end{aligned}$$

What's the probability that one of these combinations will occur?

$$\begin{aligned} \text{Pr (player pushing)} &= 0.006336 + \\ 0.006336 + \dots 0.079601 &= 0.195462^* \end{aligned}$$

What's the probability of the player **WINNING?**

Pr (player winning) = 1.0 – Pr [player  
losing] – Pr (player pushing)

$$\begin{aligned} \text{Pr (player wins)} &= 1.0 - 0.125000^* - \\ 0.195462^* &= .679538^* \end{aligned}$$

What's the player's **EV (Expected Value)?**

$EV[\text{standing}] = (\text{Payoff} \times \text{Pr}[\text{winning}]) - (\text{Bet} \times \text{Pr}[\text{losing}])$

$EV[\text{standing}] = (1 \text{ Betting Units} \times 0.679538) - (1 \text{ Betting Unit} \times 0.125000) = 0.554538 \text{ Betting Units}$

The player's **EV of STANDING = 0.554538**  
Betting Units

And the player chooses to **HIT.**

<Add logic for lose, push, win, and  
EV with hitting; see STAND>

The player's **EV of HITTING = -0.849029**  
Betting Units

And the player chooses to **DOUBLE.**

<Add logic for lose, push, win, and  
EV with doubling; see STAND>

The player's **EV of DOUBLING = -1.701655**  
Betting Units

And the player chooses to **SPLIT.**

<Add logic for lose, push, win, and  
EV with splitting; see STAND>

The player's **EV of SPLITTING = -0.371278** Betting Units

The highest EV is to STAND; therefore, the basic strategy recommendation is to STAND.

### *Strategies Other than Basic Strategy*

Many players don't appreciate that the basic strategy recommendation is the player's one and only "right" move. They prefer to think of the basic strategy recommendations as guidance subject to "tactical updates." This incorrect notion prevents players from winning.

There are lots of ways to justify not using basic strategy, but the three most common are: board counting, guessing, and intuition.

## ***Board Counting***

Board counting involves “loosely” tracking the cards on the table and previously dealt for trends and using this to stand, hit, double, split, or surrender. (This is not card counting which uses a rigorous counting method to estimate the cards remaining in the shoe.)

Unless you are a genius, board counting doesn’t work. There are simply too many cards and calculations for an on-the-fly to be accurate.

The best way to prove this is to try it. Have someone slowly deal out four or more decks of well-shuffled cards and try to estimate the proportion of any cards or card group remaining. In almost all cases, you will be wrong.

**Tracking the cards to make a play decision is a mistake.**

It’s hard to convince players of this. Once they see lots of low-value or high-value cards dealt, they are convinced that they know the makeup of the remaining cards. The idea that “statistical significance” is hard to determine doesn’t deter them from making play decisions contrary to the basic strategy recommendations.

## ***Guessing***

Players who have an incomplete knowledge of the basic strategy recommendations are more likely to guess at those they don’t know, and most of the time they are wrong. This is especially true for those recommendations like doubling and splitting that are the hardest to learn.

This guessing wouldn’t be so bad except the hard-to-learn recommendations are also the ones that are the biggest



moneymakers for the player. Doing the “right” thing with these is essential to winning.

**Hard-to-remember recommendations are the big moneymakers.**

### *Intuition*

Lots of players think it’s okay to go with your gut on close calls. For example, with a player’s 16 versus a dealer’s 10, the probability difference between hit and stand is only six one-thousandths, which means that in a thousand hands, you will win 506 times if you hit and 494 times if you stand.

So, choosing to stand sometimes is not so bad, right?

Unfortunately no. If you make this wrong decision ten-thousand times, you will lose 5,060 times and win 4,940 times, which means you will lose 120 hands that you could have won. In other words, making the wrong decision on a close call has a cumulative rather than a one-off effect. At 55 hands per hour; it doesn’t take long for these cumulative effects to add up and impact your winnings.

**The impact of wrong decisions on close calls is cumulative.**

Interestingly, many players say it’s more comfortable for them to make the wrong decision, claiming that they are okay with losing if they didn’t make the decision that precipitated it, which is why many players stand on 16 versus 10 rather than to hit. Don’t do it...follow the recommendation.

\*\*\*

Most players are aware that it’s necessary to follow the basic strategy recommendations to win, but the prospect of learning 100% of basic strategy is intimidating, especially if the player tries to memorize the recommendations as a list of

rules. It's also problematic to memorize an abbreviated list of rules since any abbreviated list has built-in errors. Asking another player is equally bad as they often give the wrong answer.

Some players resolve this by asking the dealer, who may have been dealing blackjack for years or decades, for advice. Surprisingly, dealers often give the wrong advice as well.

A better way to address this issue is to bring a wallet card to the table or to use visualization.

### **The 99.9% Wallet Card**

Basic strategy recommendations are usually presented as a decision table or chart. These have been printed on wallet cards that players can use at the tables. Referring to such a card is an easy way to not make basic strategy mistakes.

However, there are two problems associated with this. First, players who are constantly referring to their wallet cards during play slow the game down and identify themselves as novices. Second, there are more than 720 different combinations of cards and hundreds of different game rules, getting all this information on a credit-card-sized wallet card is impossible.

One way to mitigate these issues is learn the card well enough so that it's only needed on an exception basis. Another is to find a card that gives the recommendations for the most popular rules and exceptions.

We have designed a free wallet card the works 99.9% of the time. We call it the "99.9% Wallet Card." Just use the pdf version available online or copy, print, and fold the page that follows. It's only a piece of paper, but it works. Here's why.

Most casinos these days use a small sub-set of the hundreds of possible blackjack table rules. These are:

- Dealer *hits* on soft 17
- Double and split are allowed
- Surrender is *not allowed*
- Four or more decks are in use
- Dealer peeks for blackjack

**Rules: hit on soft-17, double after split, and no surrender.**

However, there are some exceptions to this list which are also common:

- Dealer *stands* on soft 17
- Surrender is *allowed*
- *Both* of the above exception conditions are allowed

**Exceptions: stand on soft-17, surrender, both.**

These few rules and their exceptions cover 99.9% of the blackjack games that most recreational players are going to find. They are the ones used the decision chart that follows.



As you can see, the rules are shown in the left-most column, and the exceptions to these are shown in the three columns to the right under the heading “WHEN THIS RULE CHANGES TO THIS...DO THIS INSTEAD.”

Again, this one decision chart is the only one most players will ever need.

The “99.9% Wallet Card,” shown in the following diagram ready for printing, compresses this information even further so it all fits on one tri-fold wallet card.

Rules: Hit S17. No Surr, 4Dks, DAS, Peek

HARD HAND		Dealer's points (up card)									
Player's	2	3	4	5	6	7	8	9	10	11	
≤8	H	H	H	H	H	H	H	H	H	H	H
9	H	D	D	D	D	H	H	H	H	H	H
10	D	D	D	D	D	D	D	D	H	H	H
11	D	D	D	D	D	D	D	D	D	D	D
12	H	H	S	S	S	H	H	H	H	H	H
13-16	S	S	S	S	S	H	H	H	H	H	H
≥17	S	S	S	S	S	S	S	S	S	S	S

SOFT	2	3	4	5	6	7	8	9	10	11	
A2-A3	H	H	H	D	D	H	H	H	H	H	H
A4-A5	H	H	D	D	D	H	H	H	H	H	H
A6	H	D	D	D	D	H	H	H	H	H	H
A7	D	D	D	D	D	S	S	H	H	H	H
A8	S	S	S	S	D	S	S	S	S	S	S
A9-A10	S	S	S	S	S	S	S	S	S	S	S

KEY: S Stand H Hit D Double Sp Split Su Surrender

PAIR	2	3	4	5	6	7	8	9	10	11	
2s, 3s	Sp	Sp	Sp	Sp	Sp	Sp	H	H	H	H	H
4s	H	H	H	Sp	Sp	H	H	H	H	H	H
5s	D	D	D	D	D	D	D	D	H	H	H
6s	Sp	Sp	Sp	Sp	Sp	H	H	H	H	H	H
7s	Sp	Sp	Sp	Sp	Sp	H	H	H	H	H	H
8s	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp
9s	Sp	Sp	Sp	Sp	Sp	S	Sp	Sp	S	S	S
10s	S	S	S	S	S	S	S	S	S	S	S
Aces	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp

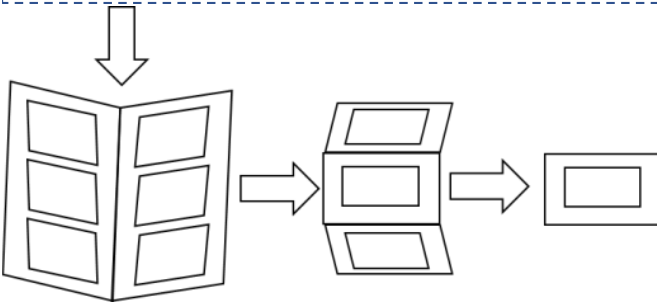
		Exceptions									
STAND S17		Dealer's points (up card)									
Player's		2	3	4	5	6	7	8	9	10	11
Hard 11		D	D	D	D	D	D	D	D	D	H
A7		H	D	D	D	D	S	S	H	H	H
A8		S	S	S	S	H	S	S	S	S	S

Surrender											
Player's		2	3	4	5	6	7	8	9	10	11
Hard 15		S	S	S	S	S	H	H	H	Su	Su
Hard 16		S	S	S	S	S	H	H	Su	Su	Su
Hard 17		S	S	S	S	S	S	S	S	S	Su
Pair of 8s		Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Su

Stand S17 & Surrender		Dealer's points (up card)									
Player's		2	3	4	5	6	7	8	9	10	11
Hard 11		D	D	D	D	D	D	D	D	D	H
Hard 15		S	S	S	S	S	H	H	H	Su	Su
Hard 16		S	S	S	S	S	H	H	Su	Su	H
A7		H	D	D	D	D	S	S	H	H	H

BLACKJACK TRUTH - 99.9% Wallet Card					
BANKROLL REQUIRED					
Play Hours	Average Bet				
	\$5	\$10	\$15	\$20	\$25
1	\$86	\$173	\$259	\$346	\$432
2	\$123	\$246	\$369	\$492	\$615
3	\$151	\$303	\$454	\$606	\$757
4	\$176	\$351	\$527	\$702	\$878
5	\$197	\$394	\$591	\$788	\$985
6	\$217	\$433	\$650	\$866	\$1,083

Assumes 55 hands/hr, .5% edge; no errors; 95% confidence



The 99.9% Wallet Card greatly simplifies the task of following the basic strategy recommendations and using it

on an exception basis is a reasonable way to play a perfect basic-strategy game. However, this is not a long-term solution for most of us.

What's needed is a method for *visualizing* the basic strategy decision chart in your mind during play.

## Visualization

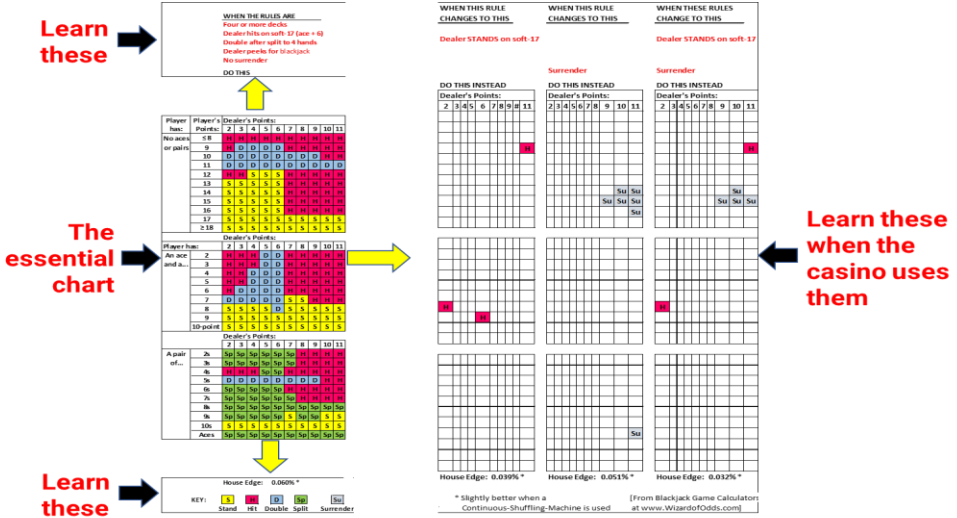
Although the 99.9% Wallet Card is okay for temporary use on an exception basis, it's still too complicated for any normal person to remember or to visualize during play, so we simplified it even further by:

- Removing the exceptions shown in the three right-hand columns. (Recalling the exceptions and their recommended actions is unnecessary because there are so few of them. If a player encounters them in a casino, he can learn them at that time.)
- Learning the most popular rules and removing them from the chart. (Once memorized, which is easy, these are just clutter.)
  - Four or more decks
  - Dealer hits on soft 17
  - Double after split allowed
  - Dealer peeks
  - No surrender
- Learning the abbreviations and removing them from the chart. (These are also just clutter once learned.)

S	=	Stand
H	=	Hit
D	=	Double
Sp	=	Split
Su	=	Surrender

The resulting simplification is illustrated in the diagram that follows. It's a much more manageable decision chart.

Here's how the chart is simplified:



What's left is the more manageable chart shown below.

Player has:	Dealer's Points:	2	3	4	5	6	7	8	9	10	11
No ace or pairs	5-8	H	H	H	H	H	H	H	H	H	H
	9	H	D	D	D	D	D	H	H	H	H
	10	D	D	D	D	D	D	D	D	H	H
	11	D	D	D	D	D	D	D	D	D	D
	12	H	H	S	S	S	H	H	H	H	H
	13	S	S	S	S	S	H	H	H	H	H
	14	S	S	S	S	S	H	H	H	H	H
	15	S	S	S	S	S	H	H	H	H	H
	16	S	S	S	S	S	H	H	H	H	H
	17	S	S	S	S	S	S	S	S	S	S
≥ 18	S	S	S	S	S	S	S	S	S	S	
Dealer's Points:											
An ace and a...	2	H	H	H	D	D	H	H	H	H	H
	3	H	H	H	D	D	H	H	H	H	H
	4	H	H	D	D	D	H	H	H	H	H
	5	H	H	D	D	D	H	H	H	H	H
	6	H	D	D	D	D	H	H	H	H	H
	7	D	D	D	D	D	S	H	H	H	H
	8	S	S	S	S	D	S	S	S	S	S
	9	S	S	S	S	S	S	S	S	S	S
	10-point	S	S	S	S	S	S	S	S	S	S
	10-point	S	S	S	S	S	S	S	S	S	S
Dealer's Points:											
A pair of...	2s	Sp	Sp	Sp	Sp	Sp	Sp	H	H	H	H
	3s	Sp	Sp	Sp	Sp	Sp	Sp	H	H	H	H
	4s	H	H	H	Sp	Sp	H	H	H	H	H
	5s	D	D	D	D	D	D	D	D	H	H
	6s	Sp	Sp	Sp	Sp	Sp	H	H	H	H	H
	7s	Sp	Sp	Sp	Sp	Sp	Sp	H	H	H	H
	8s	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp
	9s	Sp	Sp	Sp	Sp	S	Sp	Sp	S	S	S
	10s	S	S	S	S	S	S	S	S	S	S
	Aces	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp	Sp



The specific methods used to visualize the decision charts are essential for the player to learn and are therefore in the first section -- *What's Needed to Win?*

## The History of Basic Strategy

Before 1957 there was no “right” way to play blackjack. A lot of advice was coming from many colorful characters like Jess Marcum, System Smitty, and Greasy John and from convincing books like *Culbertson's Card Games Complete*, but for the most part, the advice was based on experience rather than any statistical analysis. Back then, blackjack was truly a game of chance fit only for real “gamblers.”



In 1953, Roger Baldwin, an Army private, mathematician, and blackjack player, realized that given blackjack’s rules, there had to be one right decision for every hand. This lightbulb moment was the start of a new age for blackjack, one that would eventually attract millions of players.

Knowing he was onto something, Baldwin set to work developing the mathematical formulas needed to determine the odds for each option. Baldwin reasoned that since: a) the dealer could not make any choices, b) the player’s cards were known, and c) the dealer’s face up card was known, it was theoretically possible to find the optimal player decision

by calculating the odds of each option (hit, stand...) for every possible hand.

It soon became clear that he needed help to flesh-out and validate his formulas and to calculate the odds. So, he enlisted three of his Army friends from the Aberdeen Test Center -- Wilbert Cantey, Herbert Maisel, and James McDermott -- all young, enlisted men and mathematicians. The four of them began work on what they would eventually call basic strategy. They had access to the Army's adding machines at their post, but no practical computers, operating systems, or sophisticated apps like Excel were available at the time.

In 1956, they submitted the paper *The Optimum Strategy in Blackjack* to The Journal of American Statistical Association and in 1957, they published the book *Playing Blackjack to Win* which explained their breakthrough strategy. The public didn't pay much attention to either.

Fortunately, Edward O. Thorp, an MIT professor, did. He took the *basic strategy* formulas and validated them then he went a step further to show that using the same principles, it was possible to gain a mathematical advantage over the house by counting cards. He published a groundbreaking book *Beat the Dealer* on the subject in 1962. Suddenly, the public realized that with *basic strategy* and card counting, they really could beat the house!

Both *basic strategy* and card counting were difficult to put into practice and the casinos still controlled the game's table rules, which they could use to raise the odds in their favor, but none of this mattered – the idea of beating the house had caught the public's attention and stirred its imagination.

The blackjack “gold rush” was on.

# ELEMENTS OF BLACKJACK MATH

This section describes some of the basic math and statistics that are part of the blackjack game.

## Expected Value

Whenever someone makes a wager, he instinctively weighs the risk of losing the bet against the reward of winning. This is the basic idea behind Expected Value (EV). The difference between the “weighted risk” and the “weighted reward” is the value the bettor can expect from his bet. This is clearer when you review the formula for expected value:

$$EV = (\text{Payoff} \times \text{Probability of Winning}) - (\text{Bet} \times \text{Probability of Losing})$$

By weighing the “payoff by the probability of winning” and the “bet by the probability of losing,” gamblers have a way of creating an apples-to-apples comparison between risk and reward. If the difference between the two is negative, it’s a bad bet; if it’s positive, it’s a good one; and if it’s zero, it’s a waste of time. Investors use similar techniques to evaluate their investments.

Let’s try it with a coin toss that pays \$1 for each \$1 bet (a 1:1 payoff):

Payoff	= \$1
Probability of Winning	= 50% (one out of two possible coin faces)
Bet	= \$1
Probability of Losing	= 50% (one out of two possible coin faces)

Using the EV formula, we get the expected value \$0:

$$\text{Expected Value (coin toss)} = (\$1 \times 50\%) - (\$1 \times 50\%) = \$.50 - \$.50 = \$0$$

Which means that the bettor should expect to win \$0 *on average* from each coin-toss bet, which he will if he plays long enough. Based on this, there's nothing for him to gain or lose on this bet, and he should use his money elsewhere.

*On average...* These are two dangerous words. Although the expected value of this coin-toss bet is \$0, as we all know, a bettor cannot receive \$0 for his bet. For each bet, he is going to win or lose \$1. Which illustrates an important point about EV -- it is an average of what the bettor can expect to win on each bet, and it only occurs after many bets have been made.

This is the *Law of Large Numbers* as it applies to expected value -- the more samples (or coin tosses in this example), the more the average return on each bet will approach the expected value.

Let's try another example, but this time let's lower the payoff on the coin toss to \$.90 for each \$1 bet.

Payoff	=	\$.90
Probability of Winning	=	0.5 or 50%
Bet	=	\$1
Probability of Losing	=	0.5 or 50%
Expected Value (coin toss)	=	$(\$0.90 \times .5) - (\$1 \times .5) = \$.45 - \$.50 = \text{minus } \$.05$

Here the expectation is that on average the bettor will lose \$.05 on every \$1 bet.

Let's try another example...a spinning wheel with 100 numbers and a \$95 payoff on a \$1 bet.

Payoff	= \$95
Probability of Winning out of 100)	= 0.01 (1 number
Bet	= \$1
Probability of Losing out of 100)	= 0.99 (99 numbers
Expected Value (spin wheel)	= $(\$95 \times .01) - (\$1 \times .99) = \$.95 - \$.99 = \text{minus } \$0.04$

The expectation is that the bettor will lose \$.04 on every \$1 bet.

This spinning-wheel bet, however, is different from the other examples. Here, the bettor is putting \$1 at risk, and he has the chance of winning \$95. Not a bad deal despite the negative EV. This is a lottery-like bet where the generous payoff motivates the bettor rather than the EV. Keno, for example, has an EV of minus \$.40 for every \$1 bet, but its payoff is often in the millions.

## House Edge

The casino has an expected value for each bet. This is usually expressed as a percentage called the house edge or the house's advantage.

In the spinning-wheel example, the player's EV was minus \$0.04 on every \$1 bet. If we turn this around, we can say that the EV for the house is \$0.04 on every \$1 bet. In other words, the house has a 4% edge over the player.

Remember, this is an average over many bets. It's dangerous to assume that the house edge is going to apply to a small

sample. Don Johnson, for example, famously won \$15.1 million in blackjack in six months in 2011 by making a relatively small number of large bets, effectively quitting before the averages had time to take effect. (He also negotiated favorable odds with the casino in return for a promise to bet a large amount of money.)

It's also important to understand that the house edge applies to the total amount wagered, which can get very large very quickly. In an hour, for example, a typical blackjack player can make 55 or more individual bets. If this player is betting an average of \$15, the total amount he bets in an hour is \$825 (55 hands x \$15 bet per hand). The total he bets for a three-hour session would be \$2,475. The 0.5% casino's take for this typical evening of entertainment is about \$12.

Expected value (and house edge) can be calculated differently for different bets.

With roulette for example, the EV is calculated based on the "kind of bet" the player makes (single number, red/black, number group) then averaged for the game. For example, a bet on a single number is 6%...calculated as follows.

With 38 numbers on the roulette wheel (1-36, 0, and 00), the probability of hitting a single number is one out of 38 or .026. The payoff for hitting a single number is 35 to one. This means that the player's EV for a \$1 bet on a single number is  $-\$.06$  as shown below.

Payoff	=	\$35
Probability of Winning	=	0.026 (1 out of 38)
Bet	=	\$1
Probability of Losing	=	0.974 (37 out of 38)
Expected Value (Roulette)	=	$(\$35 \times .03) - (\$1 \times .97) = \$0.91 - \$0.97 = \text{minus } \$0.06$

However, the average house edge for roulette is about 4% when all possible kinds of bets are considered.

The point is that the house edge for a “game” might be very different than the edge the house has with a single bet.

The house edge for blackjack is calculated the same way. Each specific hand (i.e., the unique combination of player and dealer cards) has a different EV, and it’s only by averaging these that we get the house edge for the total game. This is often done using a computer simulation of millions of hands, although it is possible to figure it out on paper for the different table rules.

**The house edge is the average EV for all possible hands.**

## Probability

Probability compares a specific event to all possible events of the same kind. For example, the probability of getting a six (a specific event) when throwing a six-sided die (all possible events) is one out of six (or  $1 \div 6$  or 17%) since there are six sides to the die.

**Probability compares one event to all possible events.**

Probabilities can be expressed as:

- Fractions ( $1/6$ ...one-sixth)

- Decimals (0.167...167 thousands)
- Percentages (16.7%...sixteen-point-seven percent)
- Ratios (1:6...one out of six)

For example, the probability of pulling an ace from a deck of 52 cards is four out of 52 since there are four aces and 52 cards in the deck.

$$\text{Prob}(\text{drawing an ace}) = 4 \div 52 = \\ 1/13\text{th or } .077 \text{ or } 7.7\% \text{ or } 1:13$$

Simple enough, however, to find the probability of two or more events occurring, it's necessary to multiply the probabilities of each even occurring.

For example, the probability of rolling a die twice and getting six on both rolls is:

$$\text{Prob}(\text{die=six twice}) = (1 \div 6) \times (1 \div 6) = 1/36\text{th or} \\ .028 \text{ or } 2.8\% \text{ or } 28:1000$$

**Multiply probabilities to find the likelihood that all events will occur.**

To find the probability that any one even of several event will occur, add the probabilities that each will happen.

For example, the probability of “tossing a die and getting six in two tries” is:

$$\text{Prob}(\text{die=six once in 2 tries}) = (1 \div 6) + (1 \div 6) = \\ 2/6\text{ths or } .333 \text{ or } 33\% \text{ or } 333:1000$$

**Add probability to find the chance that one of many events will occur.**

This gets more involved when we consider replacement, sequence, groupings, combinations, permutations, and other complications, but for our purposes, these basic ideas are all we need.



## Odds

Odds are a different way of expressing probability. Odds compare the number of ways an event *cannot* happen with the ways it *can* happen.

“Odds” are the likelihood that an event will NOT happen.

For example, the odds of rolling a six-sided die and getting a 6 are 5 to 1 since there are five faces on the die that cannot be a six and one that can be a six. The odds of picking an ace out of a deck of 52 cards are 48 to 4 (or 12 to one) since there are 48 cards that cannot be an ace versus four that can.

From a gambler’s perspective, these are the “true odds,” that is, the chance that a random and independent event will not happen, expressed mathematically. A payoff equal to the true odd has zero EV and 0% house edge. For example, a payoff of 12 to 1 that you can pull an ace out of a 52-card deck, which has true odds of 12 to one, is zero.

To make a profit on gambling, therefore, casinos must set their payback at less than the true odds. With roulette, for instance, the true odds of picking a winning number are 38 to one, but the payoff for hitting a single number is \$35 to one (\$35 for every \$1 bet)...not \$38 to one. Over time, this difference between the payoff (also expressed as a ratio like 35:1) and the true odds (38:1) will give the casino its profit.

## Std Deviation and the Normal Distribution

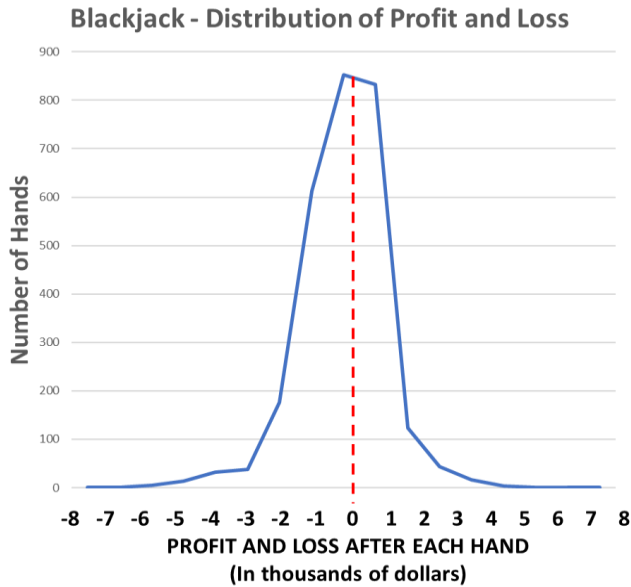
You don’t need to know statistics to understand the impact luck has on your blackjack game, but it helps.

## *The Distribution of Profit and Loss*

If you played thousands of hands of blackjack and recorded the profit and loss to your bankroll after each hand, you would get results like those shown in the following table.

<b>Profit or Loss (Rounded to Nearest Thousand)</b>	<b>Number of Hands</b>
8000	0
7000	1
6000	5
5000	14
4000	32
3000	38
2000	177
1000	612
0	852
-1000	833
-2000	123
-3000	44
-4000	16
-5000	3
-6000	1
-7000	0
-8000	0
	2752

Here the player had \$0 profit after 852 hands, \$1,000 profit after 612 hands, \$1,000 loss after 833 hands, and so on. When these results are plotted on a graph, it looks like the one below.

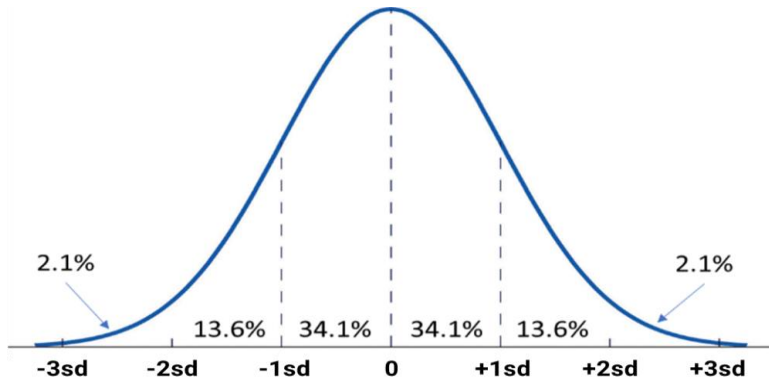


As you can see, the profits and losses are just about equal and roughly symmetrical on both sides of the average (the dashed red line). This is called a normal distribution. Also note that the shape of the curve is tall and narrow which means that most of the profit and losses are clustered around the average. This tight clustering is a result of blackjack’s rules. Other games will have a fatter or skinnier curve depending on their game rules.

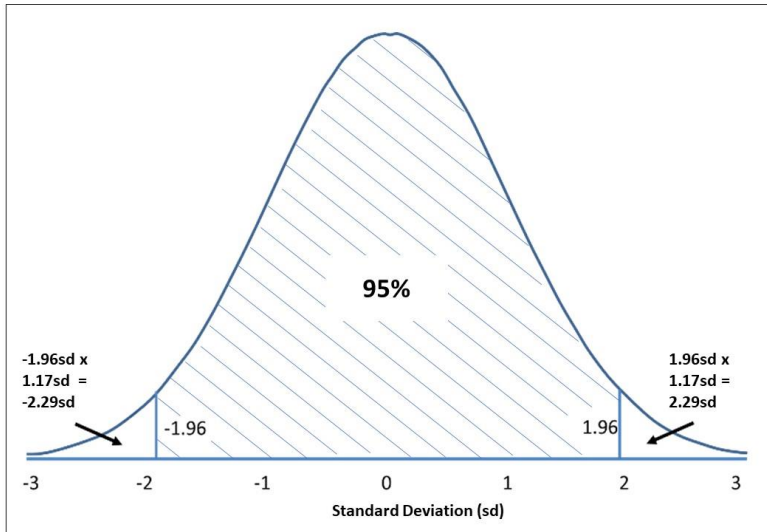
If we take the difference after each hand between the player’s bankroll and the average (which in this case is zero), we get many positive and negative variances. If we square these, calculate their average of the squares, and take the square root of the average (to get rid of the positive and negative effect), we get “the average of the variances.” This average variance is called the “standard deviation.”

This standard deviation (sd) always defines a specific proportion of the normal distribution. For example, about 68% of the values are within one standard deviation, about 95% are within 2 standard deviations, and so on.

This is easier to see in the following chart.



Things get a little complicated at this point as people begin to use the standard deviation for different real-world purposes. To keep our explanations simple, we have opted to focus on one specific range of the normal distribution -- the range that covers 95% of all values, which is between  $\pm 2$  standard deviations from the average, or  $\pm 1.96$  standard deviations to be exact, as shown in the following chart.



When we multiply the 1.96 standard deviations that determine 95% of the normal distribution by the standard deviation for blackjack of 1.17, we get 2.29 standard deviations. This defines the minimum and maximum limits of the 95% area.

In other words, we can say with 95% certainty that our profit and loss from blackjack is going to fall between  $\pm 2.29$  standard deviations of the average of \$0.

### *Maximum Loss and Profit for Blackjack*

Since the  $\pm 2.29$  standard deviation applies to a single betting unit (a token for the amount bet), to find the actual limit in dollars, we need to multiply the standard deviation by the average bet. To scale this result for the number of bets made, we need to multiply the result by the square root of the number of hands played.

*[The total standard deviation for a session is proportional to the standard deviation per hand*

*times the square root of the number of hands played.  
Ed.]*

This gives us the maximum loss and maximum profit due to normal variances (basically, it's the effect of "luck"). To find the actual limit, we need to adjust this for the effects of the house edge and any handicap the player has because of basic strategy errors.

Which means adding the house edge and handicap to the luck effect on the negative side and subtracting them on the positive side. Here are the equations for both:

$$\begin{aligned} \text{MaxLoss} = & (\text{StdDev} \times \sqrt{\text{HandsPlayed}} \times \text{AvgBet}) \\ & + [(\text{AvgBet} \times \text{HandsPlayed} \times \text{HouseEdge}) \\ & + (\text{AvgBet} \times \text{HandsPlayed} \times \text{Handicap})] \end{aligned}$$

And

$$\begin{aligned} \text{MaxProfit} = & (\text{StdDev} \times \sqrt{\text{HandsPlayed}} \times \text{AvgBet}) \\ & - [(\text{AvgBet} \times \text{HandsPlayed} \times \text{HouseEdge}) \\ & + (\text{AvgBet} \times \text{HandsPlayed} \times \text{Handicap})] \end{aligned}$$

This explanation skips a huge amount of relevant detail regarding standard deviation, variance, z-Scores, and their relationship to blackjack. However, we think any more detail crosses the line from blackjack to statistics and doubt that most recreational blackjack players are interested.

# APPLYING MATH TO BLACKJACK

Now that we have some of the math under our belts, let's apply it.

## Insurance and Even Money

Let's start with the right answer:

- No, for insurance
- No, for even money when the blackjack payoff is 3:2
- Yes, for even money when the blackjack payoff is 6:5

### *Insurance*

The internet is full of confusing explanations about blackjack insurance. Let's try to make it simple.

There's only one question to answer here -- is it worthwhile to buy insurance? The original bet has already been made; it cannot be reversed, nor does buying insurance have any effect on whether the player wins or loses the original bet. The general argument that the player is "moderating the potential loss of the original bet" is bogus as there is always a price at which the insurance is worthwhile. The question is, what's the price?

The true odds that the dealer's hole card (the face-down card) will be a 10-point card, giving him blackjack, are 36 to 16 since there are 36 cards in a 52-card deck that are not 10-points and 16 that are. If we divide 36 by 16, we get odds of 2.25 to one. Since the casino is only going to pay \$2 for every \$1 the player spends on insurance, the insurance is paying him about 11% less (\$2 versus \$2.25) than it should.

**The true odds of insurance vs the payoff favors the house by 11%.**

As we know, however, true odds are not the best way to evaluate a bet. The best way is to weigh the insurance payoff by the “probability of receiving the payoff” and to weigh the cost of the insurance by “the probability of losing the insurance investment.”

When this is done using the odds of 2.25 to one which represent a probability of 31% (16 out of 52 cards), it turns out that on average you should expect to receive \$92 for every \$100 of insurance you buy. In other words, the player will lose about 8% of every dollar paid for insurance.

**The expected value of insurance favors the house by 8%.**

This is based on the EV formula:

$$\begin{aligned} EV &= (\text{Payoff} \times \text{Probability of Winning}) \\ &\quad - (\text{Bet} \times \text{Probability of Losing}) \end{aligned}$$

Let's look at this in more detail.

Since 16 of the 52 cards in a deck (31%) are 10-point cards and 36 of the 52 (69%) are not 10-point cards, we know the odds of the dealer having a 10-point card in the hole are 31% (16/52) and not having a 10-point card in the hole are 69% (36/52).

If we plug in these numbers into the EV formula, assuming an original bet of two Betting Units (a BU is a token or placeholder for money) and an insurance amount of one BU, we get:

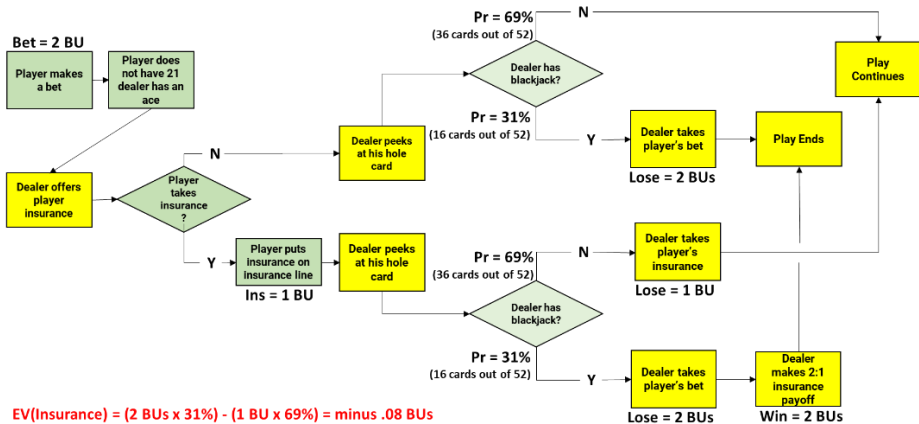
$$\begin{aligned} EV(\text{insurance}) &= (2 \text{ BUs} \times 31\%) \\ &\quad - (1 \text{ BU} \times 69\%) = \text{minus } .08 \text{ BUs} \end{aligned}$$

The expected value of taking insurance is minus .08 BUs. In other words, the player should expect to lose an average of \$0.08 on every insurance dollar.



This is illustrated in the following diagram:

**INSURANCE ... Situation: The dealer's up card is an ace; the player does not have blackjack**  
**EV = Expected Value = (Payoff x Probability of Winning) - (Bet x Probability of Losing)**  
**BU = Betting Units ... a token for money**



Most players wisely refuse insurance most of the time. However, sometimes they take insurance when they have a good hand, like one with 20 points, or they have a big bet on the table. Neither of these conditions have anything to do with the expected value of the insurance purchase.

**Insurance is a bad bet under all conditions.**

Some players argue that the dealer's ace is new information and that they should use this to hedge their original bet. This would make sense if the payoff on the insurance were higher. Remember the original bet is still going to be lost no matter how much it is hedged.

### *Even Money*

Even money is offered when the player has blackjack, and the dealer has an ace showing. It allows the player to take a one-for-one payoff (even money) immediately. If the player declines even money, the outcome may: a) be a tie (push)

where the dealer does have blackjack and the player receives nothing for his blackjack, or b) be a win where the dealer does not have blackjack and the player receives the full 3:2 or 6:5 blackjack payoff.

Again, there is only one relevant question -- what even-money decision, accept or reject, is worth more?" The loss of the original bet is irrelevant as it is already irrevocably committed.

To answer this question, we need to find the expected value (the EV) for accepting and for rejecting even money in both the 3:2 and the 6:5 blackjack game. (Note that with even money, unlike insurance, the cost of making either of these decisions is zero since the player puts no money on the line.)

### ***The 3:2 Blackjack Game***

Let's start with the situation in which the blackjack payoff is three-to-two (3:2) and the player accepts even money. For this, he receives a one-for-one (even money) payoff. Since this payoff happens 100% of the time, the "probability of losing the even money bet" is 0%. The EV for accept therefore is:

$$\mathbf{EV(\text{accept}/3:2) = (1 \text{ BU} \times 100\%) - (0 \text{ BU} \times 31\%) = 1.00 \text{ BU}}$$

If the player rejects even money in the 3:2 game, he is going to receive a 3:2 payoff, which is 1.50 BUs, 69% of the time, since there are 36 non-10-point cards in a deck of 52. The EV is:

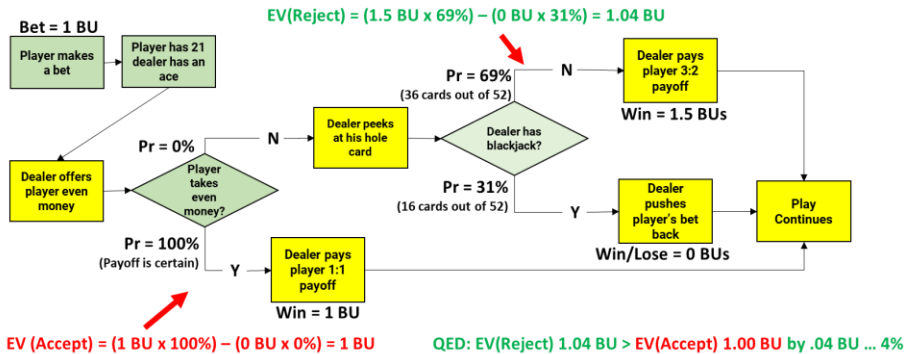
$$\mathbf{EV(\text{reject}/3:2) = (1.50 \text{ BU} \times 69\%) - (0 \text{ BU} \times 31\%) = 1.04 \text{ BU}}$$

Therefore, in a 3:2 game, the value of *rejecting* the even money offer is 4% more valuable to the player than accepting it (1.04 BUs versus 1.00 BU). In other words, on

average, the player earns \$4 more for every \$100 by rejecting even money than by accepting it.

This is illustrated in the following process flow diagram:

**EVEN MONEY ... Situation:** The dealer's up card is an ace; the player has blackjack; blackjack payoff is 3:2 (1.5:1)  
**EV = Expected Value = (Payoff x Probability of Winning) - (Bet x Probability of Losing)**  
**BU = Betting Units ... a token for money**



Be prepared for some potential pushback from other players if you make the right choice and reject even money in a 3:2 game. Some players think it's greedy to hold out for the higher 3:2 payoff and feel compelled to say it.

### *The 6:5 Blackjack Game*

Like the 3:2 game, if the player accepts even money in the 6:5 game, he receives a one-for-one (even money) payoff for his blackjack. The payoff in this case happens 100% of the time, so the probability of losing the even money bet, which is 31% since 16 out of 52 cards might be a 10, is 0%. The EV is:

$$EV(\text{accept}/6:5) = (1 \text{ BU} \times 100\%) - (0 \text{ BU} \times 31\%) = 1.00 \text{ BU}$$

Unlike the 3:2 game, if the player rejects even money in the 6:5 game, he receives a 6:5 payoff, which is \$1.20 for every

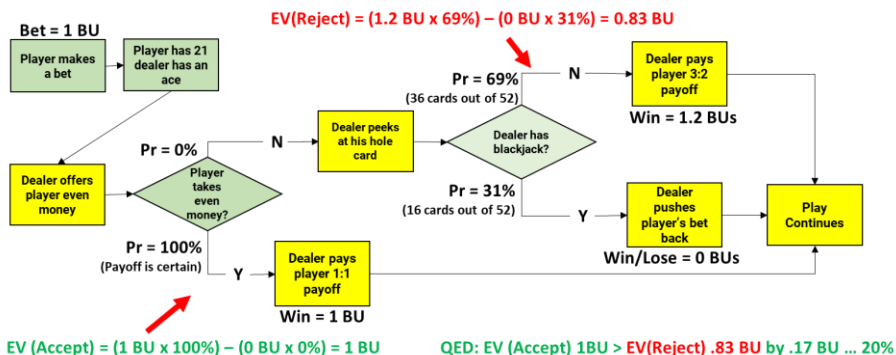
\$1 bet. He gets this 69% of the time since there are 36 non-10-point cards in a deck of 52. The EV therefore is:

$$EV(\text{accept}/6:5) = (1.20 \text{ BU} \times 69\%) - (0 \text{ BU} \times 31\%) = 1.20 \text{ BU}$$

Accordingly, in a 6:5 game, the value of *accepting* the even money offer is 20% more valuable to the player than rejecting it (1.20 BUs versus 1.00 BU).

This is illustrated in the following process flow diagram:

**EVEN MONEY ... Situation:** The dealer's up card is an ace; the player has blackjack; blackjack payoff is 6:5 (1.2:1)  
**EV = Expected Value = (Payoff x Probability of Winning) - (Bet x Probability of Losing)**  
**BU = Betting Units ... a token for money**



For those who prefer tables, here's the same analysis in tabular form:

With a 3:2 blackjack payoff

Player Accepts Even Money?	Dealer has Blackjack?	Payoff With a 3:2 Blackjack Payoff*	Probability of Winning	Bet*	Probability of Losing	EV
Yes	n/a	1.00	100%	1.00	0%	\$1.00
No	No	1.50	69%	1.00	0%	\$1.04
No	Yes	0.00	31%	1.00	0%	\$0.00

**The EV for declining even money with a 3:2 blackjack payoff is 4% more.**

With a 6:5 blackjack payoff:

Player Accepts Even Money?	Dealer has Blackjack?	Payoff With a 6:5 Blackjack Payoff*	Probability of Winning	Bet*	Probability of Losing	EV
Yes	n/a	1.00	100%	1.00	0	\$1.00
No	No	1.20	69%	1.00	0	\$0.83
No	Yes	0.00	31%	1.00	0	\$0.00

**The EV for accepting even money with a 6:5 blackjack payoff is 20% more.**

Ironically, the popular choice -- to always accept even money -- is the right one in the 6:5 game but for the wrong reason. The player is not “saving his blackjack” by accepting even money, he is simply earning more money on average with this decision. Of course, casinos know this as well and don’t offer even money in a 6:5 game all the time.

Note that since there’s at least one 10-point card in the player’s hand when even money is offered, and there are at least three cards on the table (assuming only the player and the dealer are playing), this calculation is more precisely done with 15 tens rather than 16 tens left in the deck and with 48 cards rather than 52 cards to draw from. This changes the result, but not enough for the recreational player to care.

### [Calculating the Profit and Loss Range](#)

Luck is unpredictable; however, it is possible to the equations for calculating maximum loss and profit to calculate a profit-loss range.

The equations for maximum loss and profit are:

$$\begin{aligned}
 \text{MaxLoss} &= (\text{StdDev} \times \sqrt{\text{HandsPlayed}} \times \text{AvgBet}) \\
 &\quad + [(\text{AvgBet} \times \text{HandsPlayed} \times \text{HouseEdge}) \\
 &\quad + (\text{AvgBet} \times \text{HandsPlayed} \times \text{Handicap})]
 \end{aligned}$$

And

$$\begin{aligned}
 \text{MaxProfit} &= (\text{StdDev} \times \sqrt{\text{HandsPlayed}} \times \text{AvgBet}) \\
 &\quad - [(\text{AvgBet} \times \text{HandsPlayed} \times \text{HouseEdge}) \\
 &\quad + (\text{AvgBet} \times \text{HandsPlayed} \times \text{Handicap})]
 \end{aligned}$$

Let's use some real numbers to show how it works:

Std Dev (95%)	=	2.29
HandsPlayed/Hr	=	55 (a normal rate with a full table)
Hours	=	3 (random but typical)
HandsPlayed	=	165 (HandsPlayed/Hr x Hours)
Average Bet	=	20 (a typical bet during peak hours)
House Edge	=	0.5% (typical)
Basic Strategy Handicap	=	1.5% (typical)

Plugging these numbers into the formulas for maximum loss and maximum profit, we get:

$$\text{Maximum Loss} = \$655$$

$$\text{Maximum Profit} = \$523$$

In other words, a player betting an average of \$20, at a table that plays 55 hands per hour, for three hours, where the house edge is 0.5%, and his basic strategy handicap is 1.5% has a 95% chance of losing no more than \$655 and winning no more than \$523.

Accordingly, we can say there's a 95% chance that if this player brings a bankroll of \$655 to the table, he will *not* go broke in this 3-hour session.

## The “Rule of 33”

The “Rule of 33” which is our recommended rule of thumb to determine the “required bankroll” and the “maximum

profit goal” is consistent with the well-known 3% Rule, which advises players never to bet more than 3% of their bankroll. By turning the 3% rule around and asking about bankroll size rather than bet amount we get the same “33x” result (just divide 100% by 3%).

We can also validate the “Rule of 33” by deriving it from the equation for calculating maximum loss:

$$\begin{aligned}
 \text{MaxLoss} = & (\text{StdDev} \times \sqrt{\text{HandsPlayed}} \times \text{AvgBet}) \\
 & + [(\text{AvgBet} \times \text{HandsPlayed} \times \text{HouseEdge}) \\
 & + (\text{AvgBet} \times \text{HandsPlayed} \times \text{Handicap})]
 \end{aligned}$$

We do this by plugging typical values for an evening of blackjack play into the formula and keeping the average bet as the independent variable.

<b>MaxLoss (Maximum Loss)</b>	=	<b>tbd</b>
<b>MaxProfit (Maximum Profit)</b>	=	<b>tbd</b>
<b>StdDev( Standard Deviation for blackjack)</b>	=	<b>2.29</b>
<b>HandsPlayed/Hr (Hands Played per Hour)</b>	=	<b>55</b>
<b>Hours (Number of Hours of Play)</b>	=	<b>3</b>
<b>AvgBet (Average Bet)</b>	=	<b>tbd</b>
<b>HouseEdge (House Edge)</b>	=	<b>0.5%</b>
<b>Handicap (Player’s Basic Strategy Handicap)</b>	=	<b>1.5%</b>

The result is that maximum loss is 32.8 times the average bet. In other words, the maximum loss with 95% certainty is equal to 33 times the average bet when using these typical values...as stated in the “Rule of 33.”

Let’s use the same approach to calculate the “profit target,” that is, the winning amount for leaving the game.” The result is about 31 times the average bet, but to keep things simple, we rounded by the 33 to have one rule of thumb, the “Rule of 33,” for calculating both bankroll and the time-to-leave profit.

## Luck and the House Edge

As you can see from the maximum loss and maximum profit equations, the possible range for the player's financial results can be quite large, as the -\$655 to +\$523 range in the \$20 average bet and 3-hour example shows. Although this is still a relatively skinny normal distribution, it's a lot to win or lose as a player.

This is the effect of luck which, as explained, will average out over time since it applies equally to the player and the casino.

However, many players don't accept this. They believe that the house edge is primarily responsible for their losses, that somehow the evil casino is manipulating the game to win. This is not true on two counts.

- The house edge is the result of the game's rules and is typically only 0.5% of the amount bet.
- Even when the rules are heavily in the casino's favor, such as with a 6:5 blackjack payoff, which adds about 1.39% to the house edge, the total house advantage is still less than 2% or \$20 per \$1,000 bet.
- The advantage that accrues to the house due to imperfect basic strategy play, which typically ranges from can range from 1.5% to 10%, has a much bigger impact than any effect due to rules.

Bottom line, the statement that "the casino always wins because they have the odds advantage" just is not true.

## Playing the 6:5 Game

Some blackjack experts advise players to never play the 6:5 game. We think this is a mistake.



First, not everyone can afford to play at the higher-minimum 3:2 game tables which are usually found near the 6:5 game. Of course the 3:2 game is better, but the maximum loss for a \$10-minimum game with a 6:5 blackjack premium versus a \$25-minimum game with a 3:2 premium is \$306 versus \$743. And this is only for a 3-hours session (assuming no basic strategy handicap). What if you are trapped on a cruise ship for a week; should you not play at all if you cannot afford the higher minimum?

Second, the real issue is the player's basic strategy error rate. If it's 0% to 1.5%, the 1.39% added edge caused by the 6:5 premium is tolerable. If the player's error rate is 1.5% or more, it means the total house edge is 3.39% or more, which will cause the player to lose much more frequently.

Third, our goal for the recreational player is to win as many blackjack sessions as we lose. If the probability of doing this is 49.5% (with a 0.5% house edge), we're okay. If the probability drops down to 46.6% or more (466 times out of 1,000 versus 534) with a 3.39% house edge, the proposition of winning as many sessions as we lose become much more speculative.

In our opinion, the answer for the recreational player is

- Play the 3:2 if it can be found *and* if the player can afford the potential losses.
  - If not, play the 6:5 game if the player's basic strategy error rate is 0% to 1.5%.
    - If not, don't play.

## [The Law of Large Numbers](#)

Most of what's been said so far about luck applies to the short term (for example, a single blackjack session, that is,

one evening of blackjack play). What can the player expect in the long term?

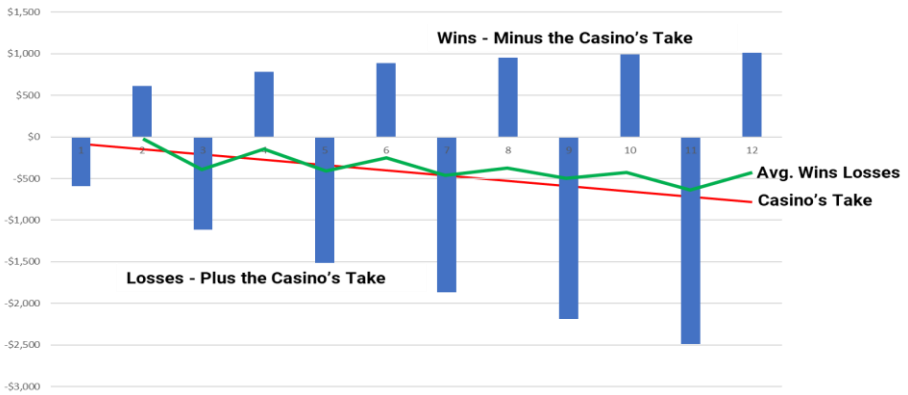
Here, it's almost all good news. Like most things in life, if you wait long enough, things even out. So it is with blackjack -- over a long period, wins and losses due to luck will tend to cancel each other out, and what remains is only the losses resulting from the house edge and imperfect blackjack play. The more you play, the more you will approach breakeven.

This is just common sense. No one has bad or good luck forever.

Statisticians call this effect the *Law of Large Numbers* which is a fancy way to say, "things average out over time." The law states "that as a sample size grows, the sample mean gets closer to the expected average for the population." For blackjack players, the "sample" is the blackjack sessions they have played, the "population" is the blackjack community, and the "expected average of the population" is breakeven, less the sum of all losses due to the house edge and imperfect play.

The following diagram illustrates this. The blue bars represent the imagined profits or losses in a series of blackjack sessions. The green line is the average of all profits and losses. The red line is cumulative loss due to the house edge." Over time, the red line and the green line will converge.

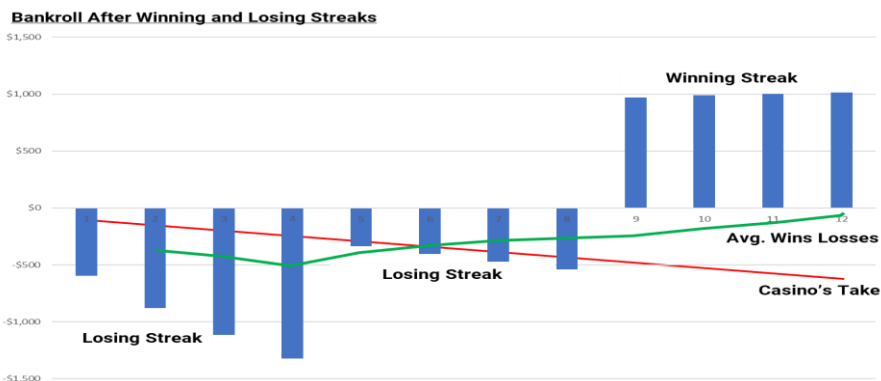
**Bankroll After Blackjack Sessions**



It's comforting in the abstract that profits and losses converge on breakeven in the long-term, but this does little to ease the gloom that follows a player's most recent loss. Additionally, no one knows when breakeven will happen. Like all statistics, the *Law of Large Numbers* is a general principle. However, understanding it helps the player put short-term effects like streaks into perspective.

## Winning and Losing Streaks

Regrettably, luck is not consistently kind to blackjack players in the short term. The regular pattern of alternating wins and losses depicted in the previous diagram is rarely seen in the real world. A player is more likely to see prolonged periods of wins and losses -- the proverbial "streaks" -- as illustrated below.



Anyone who has ever played the game has run into streaks. They are exhilarating when you're winning and devastating when you're losing. In fact, most players are astonished by the phenomenal staying power of blackjack's losing streaks.

“Astonished” is the right word as these losing streaks seem to go on forever, so long that players often rant about their “mathematical impossibility” and the “undeniable proof” that some higher power is involved with their game.

Let's deal with this ranting first. It is not just the player's imagination -- players do lose more hands than dealers; however, a higher power is not causing this. As much as we would like to blame our losses on a tyrannical blackjack god, this is not the case no matter how long the losing streak lasts. The reason for a player's long losing streaks is much less dramatic. It's because of the way the game is structured -- a blackjack player wins only four hands out of ten (42%) on average, which is offset by the player winning larger bets. When these are averaged out, the house is left with a small house edge over the player of about 0.5%.

**Players lose more hands but win larger bets.**

Why is this? Why do dealers win more hands and players win bigger bets?

One big reason is that the dealer has a much better chance of winning the hand by playing after the players since the players will often bust even before the dealer is required to take a card. Other reasons are that players win big (a 3:2 payoff) when they have blackjack, when they can double down (a 2:1 payoff), and when they can split pairs (potentially an enormous 8:1 payoff by splitting and doubling). The player even has an advantage when he has a terrible hand by surrendering (a 1:2 payoff). The important conclusion that comes out of this is that a blackjack player must have patience and wait until he has the advantage and then maximize his bet.

Right...!

This is easy to say but hard (nearly impossible!) to do. The player who is in the middle of an epic losing streak is simply not psychologically prepared to bet the farm when opportunity knocks. Many players, even experienced ones, often hesitate at these critical moments and refuse to double, split, or surrender because they think “luck is against them.”

Don't fall into this trap; you are not playing against vengeful blackjack gods no matter how much you want to believe it -  
- luck has no mind and no memory.

**Take every advantage by doubling, splitting, and surrendering.**

Again, this is easy to say but hard to do when you are losing your shirt. Which is why players change tables, change seats, skip hands, leave then return to the casino, and practice any number of other voodoo tactics. We all do it, it's human nature; we all have an instinctual “faith” in the supernatural power of luck.

## OTHER THINGS TO KNOW ABOUT THE GAME

The following sections address several blackjack-related subjects that are good to know.

### The Gambler's Fallacy

The gambler's fallacy is the belief that what has happened in the past affects the future. For example, most people think that if you flip a coin and get five tails in a row, the chances of getting another tail are lower. This is just not true; the probability of flipping the coin the sixth time and getting a tail are the same 50% they were on the first flip. Why would they change? Who would change them?



Whatever. It doesn't matter how often or how many ways it's said, we are all influenced by our belief that there is balance in the universe.

In addition, we are confused by perspective. When we are at the sixth flip of the coin, we are looking back and saying, "the next flip has got to be heads." It would be a different story if we were at the first flip and looking forward.

For example, the probability of tossing five tails in a row is only 3% (calculated by multiplying the probability of each flip together  $[0.5\% \times 0.5\% \times 0.5\% \times 0.5\% \times 0.5\%]$ ) even though the probability of tossing the coin on the sixth try and getting tails is 50%.

The same is true with blackjack. A player who loses five hands in a row has no better chance of winning the sixth hand than the first. However, looking forward, the odds against losing five hands in a row with a 0.5% house edge are about 30 to one.

More to the point, a player who is losing nine out of ten hands for hours “just knows” that his luck is about to change or that it is going to remain bad. It’s only common sense, right? Wrong. Neither of these is true.

Players should certainly take a break or leave the casino when they are tired, discouraged, or broke, but not to change their luck.

**Play as if luck has no mind or memory even if you don’t believe it.**

Players try to affect their luck in many ways. One of the most appealing is to use a betting system.

## Betting Systems

Betting systems are methods of betting designed to minimize losses and maximize winnings.

The popular Martingale system, for instance, requires the player to double his bet after each losing hand and to cut his bet in half after each winning hand. For example, if the player starts with a \$100 bankroll and loses his first bet of \$20, reducing the bankroll to \$80, he is required to double his bet to \$40. If his second bet of \$40 is also lost, reducing his bankroll to \$40, he is required to increase his bet to \$80. If his third bet is lost, reducing his bankroll to \$0, he is required to double his bet to \$160. If his fourth bet is won, increasing his bankroll to \$160, he is required to halve his \$160 bet to \$80, and so on.

This approach to betting allows a player to systematically bet more to recover his losses and systematically bet less to preserve his winnings. It works well until the player runs into a streak of bad luck and the doubling causes him to exceed his bankroll or the table's betting limit.

Which prompts the advocates of these systems to invent other, even more complicated (obfuscating) ways, to avoid going broke.

It's all hokum. The problem with all betting systems is that they eventually reach immutable limits that cause them to fail. More importantly, they have no effect on luck, which is random, or on profits.

**Betting systems don't work to change a player's luck.**

This is not to say that players should not vary their bets. Part of the fun of blackjack is trying to beat the odds, which will certainly happen more quickly if the player is lucky enough to have large bets on winning hands. Of course, the opposite is true as well -- the player is going to lose more quickly if he is unlucky enough to have large bets on losing hands. Again, it is a matter of luck.

## [Card Counting](#)

What Professor Thorp discovered in his detailed analysis and validation of *basic strategy* was that the player had a slight advantage when there was a higher proportion of 10-point cards remaining in the deck (or the shoe) than other ranks.

This is because the dealer must hit on 16 or less, and the chance of the dealer busting is more likely with higher value cards. If the player knows about this temporary imbalance, he can raise his bet to take advantage of it.



So, the problem for Thorp was to devise a practical way for the player to know when the proportion of 10-point cards left in the shoe was high enough to warrant increasing his bet.

Since then, blackjack experts have invented many systems to determine this. To illustrate how they work, let's use the popular and easy to understand High-Low system of card counting first introduced by Harvey Dubner in 1963.

With Dubner's High-Low system:

- Card ranks 2-through-6 count as 1 point,
- Ranks 7, 8, and 9 are ignored, and
- Ranks ten, jack, queen, king, and ace, count as minus 1 point.

As the dealer reveals each card, the card counter adds 1, 0 or -1 to his running count. When the running count gets high, the card counter knows that more cards of rank 2, 3, 4, 5, and 6 (the cards with the +1 value) have left the deck than cards of rank ten, jack, queen, king, and ace (the -1 value cards). When this occurs, the player evaluates the proportion of the deck left to be dealt and increases his bet accordingly, knowing the dealer is going to bust more often than normal.

It's a lot more complicated than this, but this is the gist of it.

Keeping the running count, however, isn't easy; it requires the player to maintain an intense focus on the cards being dealt. Raising his bet without attracting attention is also tricky. In the end, after all this concentration and stress, the advantage the card counter has over the dealer is generally small (less than a percentage point), which means that the winnings accumulate slowly unless the card counter makes exceptionally large bets relative to what he had been betting,

which, of course, will immediately bring him to the attention of the casino's management.

In the movies, the card counter doesn't risk discovery by raising the bet himself. He quietly signals a partner waiting nearby that the table's "running count" is high, and his partner innocently joins the game and immediately puts down large bets. Casinos of course are wise to this tactic and are watching for it. We can also expect that computers will be watching the cards and automatically calculating the running count in the future.

Also remember that the slightly better odds the card counter acquires by counting is a long-term advantage. In the short term, anything can happen, including a streak of bad luck just when the counter's bets are at their peak. The casino has the funds to weather these setbacks, the card counter may not.

## [More on the House Edge](#)

The house edge is the built-in advantage the casino has over the player because of the game's rules. Typically, casinos structure their table rules so that their edge with blackjack is about 0.5% of the total amount bet or about \$5 for every \$1,000 bet. This is the lowest house edge of all casino games. The player's basic strategy errors, however, can increase this rate to excessive levels. Unfavorable table rules such as the following can do the same.

- Eight decks versus four add a tiny 0.08% to the house edge
- The 6:5 versus 3:2 blackjack payoff adds a whopping 1.39%
- The dealer hitting on soft 17 versus standing adds a modest 0.22%
- Early surrender versus no surrender adds about 0.24%

## *Table Rules That Affect Play*

Small casinos can and do change table rules -- sometimes to increase their profits, sometimes to attract players. These changes affect the house edge and the basic strategy recommendations.

There are many different table rules in blackjack including those that change the...

- Number of decks used (one, four, six, eight)
- Definition of what constitutes blackjack (first two cards, suited, 5 cards...)
- Blackjack payoff (3:2, 6:5, 7:5, 1:1...)
- Condition for doubling (not allowed, on 10 or 11, on any card...)
- When the dealer must hit (16 only, 16 and soft 17...)
- Amount of the double bet (double the first bet, double for less, triple...)
- Conditions for splitting (is it allowed? On any pair...?)
- Number of splits allowed (three, unlimited)
- Splitting of aces (is it allowed? No blackjack after splitting...)
- Right to surrender early (allowed?)
- Right to surrender late (allowed, against an ace, against a 10, both...)
- Hole card (Is there one...?)
- Definition of a tie (Same number of points...?)
- When the dealer busts (>21, >22...)

The average blackjack player is going to encounter these only rarely. Yes, you can find casinos where some unusual variant of table rules is in effect, but most blackjack players are going to play the more popular table rules, which are:

- Four or more decks
- Blackjack pays 3:2 (although this is quickly changing to 6:5)
- Players can split three times to a maximum of four hands
- Players can double after splitting
- Dealers must hit on 16 or less and on soft 17, otherwise stand
- No surrender

In general, the table rules that vary the most and that affect the house edge are:

- The blackjack payoff
- If the dealer hits or stands on soft 17
- If the player can surrender or not

The following comments apply to the popular table rules. That is, the ones that most players are likely to find.

### **The Number of Decks Used**

The single-deck game reduces the house edge by about 0.6%, which in theory gives the player the edge.

*In theory...*

Most single-deck games will almost always have a compensating rule such as the 6:5 blackjack payoff that moves the house edge back in the casino's favor.

A more relevant comparison (since most players are not going to play the single-deck game) is the number of decks used in the multi-deck game. Here, there is an insignificant 0.04% difference between the use of four and six decks, and between the use of six and eight decks.

The use of a Continuous Shuffling Machine (CSMs) changes this slightly in the player's favor, but the CSM's most noticeable effect is on the rate of play which will be much faster. The CSM also eliminates the ability of a card counter

to estimate the composition of the cards left in the deck. As more CSMs come into use, there will be less card counting.

### **Blackjack Payoff**

The 6:5 payoff gives the house an additional edge over the player of about 1.39%. A 3:2 payoff for blackjack has been the traditional way in which casinos reward players for blackjack. The trend nowadays, however, is to offer this payoff only at the higher-minimum tables (e.g., those tables with a \$25 or more minimum bet) and to offer the much less desirable 6:5 payoff on the lower-minimum tables. The printing on a blackjack table almost always specifies which version of this rule applies.

### **When the Dealer Must Hit**

The dealer hitting on soft 17 (an ace and a six) adds 0.22% to the house edge. In the traditional blackjack game, the dealer must hit on a point total of 16 or less and stand on a point total of 17 or more (soft or hard). These days, most table rules have the dealer hitting on soft 17 which is more advantageous for the casino. The printing on the blackjack table will almost always specify which rule applies.

## **Surrender**

Surrender gives the player the right to quit his hand and lose only half the bet. When this rule applies early (before the dealer peeks) it reduces the house edge by about 0.24% or \$.24 for every \$100 bet. (Early surrender is rare.) When this rule applies late (after the dealer peeks) it has a small 0.08% effect in the player's favor.

## **The Worst Playing Strategies**

Some blackjack players have adopted strategies for playing the game that sound sensible but are not. The following are the worst of them.

### **Don't Ever Bust**

The player following this strategy never takes a card when the card might cause him to bust. In other words, a player with this strategy will stand whenever the point value of his hard hand is 12 or more. This gives the house an advantage of almost 4%.

### **Do What the Dealer Does**

Some players think it is smart to follow the rules the dealer must follow "since the house always has an advantage over the players." This is a mistake as players who mimic the dealer do not have the structural, rules-based advantages the dealer has, for example, in playing after the other players, and in hiding one of their cards (the hole card). This upside-down logic increases the house's advantage by about 5.5%.

### **Always Assume the Hole Card Is a Ten**

The tortured argument behind this popular alternative strategy is clear -- since there are 16 ten-point cards, 31% of a deck, the most likely value of the hole card is 10 points.

This is correct, but it ignores the fact that the hole card is twice as likely not to be a 10-point card. This strategy gives the house a whopping 10% advantage over the player.

### **Playing the High-Roller Tables Whatever Your Bankroll**

A large casino often offers the best table rules (and the best odds) at the high-minimum and high-roller's tables. Having better rules is a huge advantage, but it does not change the math regarding peaks and troughs in your bankroll. Without an adequate bankroll these swings can easily cause the player to go broke early.

### **Never Surrender!**

Most casinos don't offer late surrender (a 0.08% advantage for the player). Even when it's offered, many players don't know how or when to use it. Incredibly, some experienced players are reluctant to surrender because it makes them "look weak" or because it invites the ridicule of players who view it as slowing down the game. These are not good reasons to forego any advantage.





## ADVICE / OPINION

Giving advice is always a risky proposition, especially when there's no quantitative analysis to back it up. However, much of the information consumed by recreational players about blackjack is poppycock -- wrong, misleading, or nonsense cloaked in technical gobbledygook. The player needs to sort through this and decide which makes sense. Here's our list.

### Etiquette

#### **Don't touch anything on the table...**

Except your own chips! And touch those only to make a new bet; or to collect your winnings after the dealer has made the payoff. The dealer will handle the cards and collect all bets himself.

#### **Use clear, easy-to-understand hand signals...**

And if you like, confirm your intention verbally. The security cameras watching the play need to record the player's hand signal. This is critical if there's a dispute. Sloppy signaling is the most common reason for disputes at the table. Take the time to signal correctly.

#### **When you are ready to play, just put your money on the table**

There's no need to throw your money across the table or wave it back and forth. The dealer knows you are here to play, and he will get you into the game as soon as possible.

#### **When you want to leave, push your chips forward slightly and wait**

The dealer will change your small denomination chips to larger ones (color up) as soon as he has an opportunity. Take these to the cashier's window to exchange for cash or hold them for later play. Don't try to leave the table with a pocket full of small-value chips as this could deplete the table of needed chips. Don't try to help the dealer by stacking the chips; the dealer needs to do this for the overhead cameras.

Sometimes, by accident, a player who wants to leave pushes his/her chips onto the betting circle. If the dealer mistakes the player's intention, he might deal the player a card. If you then proclaim your intention was to leave, it's a dispute.

### **Don't give unsolicited advice, comments, or criticism...**

Of someone's play unless he asks you for it. Making another player feel like a fool is not appropriate even if he is playing like one. This holds true even when his sloppy or erroneous decisions affect the outcome of a deal. His mistakes will work in your favor as often as they work against you.

### **Don't criticize the third baseman**

Many people like to complain about the decisions of the player immediately to the dealer's right -- third base -- because his play can result in the dealer getting good cards. This is not sensible; no one knows what cards are coming next and there is no way this player or any other can change the random outcome of the game.

*[The reason the third baseman gets such a bad rap is that it's easier for some players to*

*accept a loss when the dealer gets his cards from the blackjack gods rather than because of the third baseman's decisions. Ed.]*

**Take all advice, even from the dealer, with a grain of salt**

Strangely, most of the advice given at a blackjack table is wrong. Many players and dealers rely on blackjack lore and entrenched beliefs like “never refuse even money.” The best way to deal with well-intentioned advice is to smile and play your own game. Having an intelligent debate at a blackjack table while play is underway is problematic.

**Don't shout, scream, swear, or otherwise carry on when you win or lose**

This is disrespectful of the other players. Reasonable players are usually conservative, saving their enthusiasm for those few times of real happiness or disappointment.

**Don't spill your food or drink on the table**

No one will ask you to wear a dunce cap with “moron” printed on it if you spill your food or drink, but they might as well because you'll feel like one.

**Don't distract the other players**

The players in most games are naturally friendly towards each other and talk. This is fine until it interferes with play. If a player is trying to follow the game closely or needs quiet to remember the right basic strategy play, then stifle yourself. Imagine the blackjack table is a putting green.

## **Don't make jokes about card counting or cheating at a blackjack table**

This will bring you to the immediate attention of the pit boss and once again label you as either a card counter, a cheat, or a nincompoop. If you then do something suspicious, even if it's innocent, management will be all over you. Casinos are almost as sensitive about card counters and cheaters as airlines are about bombers.

## **Don't flaunt your success or bemoan your losses**

No one cares. This also applies to players who are constantly counting their chips.

## **Pay attention to the game**

Don't delay the game by talking to someone who's not playing, by watching the TV monitors, or by being diverted in some other way. The dealer will usually say something after a while, but why make this necessary? Even worse, some players are oblivious to the dealer's admonition, potentially sparking table rage from the other players.

*[This is one of the most annoying and disrespectful table behaviors and it happens often! Why should the rest of the players at the table have to wait for you? Ed.]*

## **Play multiple positions only when plenty of seats are available**

Some players believe (wrongly) that they have a better chance of winning by using adjacent betting circles to play multiple hands at the table. If other players are waiting for seats, the right thing to do is

stop playing these multiple hands and allow other players to join. Sometimes, a player who thinks he is having a run of luck will refuse to stop playing an extra position even when requested by the dealer.

*[This is another of those especially boorish behaviors that annoy other players. There is no difference in the odds between playing two positions and doubling your bet on one position. If you think it is your right to play multiple positions because you got there first or because you are betting more than other players, then you are, by definition, an ass. Ed.]*

### **Respect the local conventions**

When in Rome... Sometimes there are local rules or conventions. Don't buck these just because it's done differently somewhere else. For example, in most venues, players put a split bet *beside* their first bet, and they put a double bet *behind* their first bet. Some players ignore these local conventions as if insulted that they need to change their personal style of play.

### **Tip if you want, but don't make a spectacle out of it**

There are three ways to tip the dealer -- after a hand, when you leave the table, or by placing a second bet for the dealer on the edge of the betting circle. Whatever your preference, do it in a low-key way. Making a big show of tipping is boorish again. Tipping is optional and there is no traditional or expected amount or percentage.

*[Placing a second bet for the dealer slows the game for the other players. Players do it out of the superstition that the universe will reward their generosity with a winning hand. Most blackjack dealers won't say anything, but common sense says that they prefer to make their own gambling decisions. Would you want your boss to flip a coin with you for your paycheck? If you want to give the dealer a tip, just give it and let him decide if he wants to gamble with it. Ed.]*

## Misconceptions

### **There are “professional” blackjack players who make lots of money**

The longer you play, the more likely it is that your profits and losses will break even, and the closer you will come to what you are “expected to lose.” This applies to pros and duffers alike, only a card-counter or a cheat can beat the odds.

### **There are blackjack and betting "systems" that work**

No one except a card-counter or a cheat can win at blackjack in the long run. Period, end of story! No fancy betting scheme, playing trick, mojo-enhancer, streak-following methodology, exit plan, standard deviation computation, statistical analysis, where-to-sit advice, when-to-play suggestion is going to change the fact that the rules of the game always favor the house and that “in the long run” the house will always win.

*[Of course, “the long run” can be tricky to predict. Even though the odds are against it, a decent player can win big for an evening, a year, or even for a lifetime. It’s all about luck and how close you can get the house edge and if you can reduce the basic strategy skills handicap to zero. Ed.]*

### **Card-counting is simple, easy, exciting, and lucrative**

Card counting is not illegal, but it’s not for the recreational blackjack player. Yes, you can win, but forget what you’ve seen in the movies; this is not your glamorous and lucrative “Bat Masterson

moment.” It’s hard work, boring, and stressful. Also understand that the winnings come at a glacially slow pace; and that eventually, someone will catch you.

### **If luck is with you, you can win a fortune with a tiny bankroll**

Sure, it’s possible to turn a small stake into a fortune, but blackjack is a game with moderate risk and moderate returns. It is not like the lottery where players can win great fortunes by investing a dollar or two. We have all heard stories of someone saving his business by running a \$5,000 bankroll up to a million. The reality, however, is that most of what you win at blackjack is a function of the house edge, your skill, and the amount you bet, which is why it’s hard to run a tiny bankroll into a great fortune.

### **A careful player can stretch out a small bankroll to last a long time**

An adequate starting bankroll is necessary to avoid going broke prematurely.

### **Players can change their luck by disrupting the flow of things**

Wrong. There is no difference between playing 10 separate blackjack sessions with a \$500 bankroll and one session with a \$5,000 bankroll. There’s no difference between playing one hand at a time and playing multiple hands. There is no advantage in jumping from one table to another, in varying your bet, in taking a break, in moving chips between partners, in chasing a winning streak, or hiding from



a losing one. The odds of winning and losing are the same.

### **Some players can predict what the next card is going to be**

For all practical purposes, the cards come in a completely random order and all blackjack hands are independent of all other hands. Accordingly, no one except a card counter or a cheat can predict what the next card will be in blackjack.

### **Luck runs in streaks, when a streak comes along, bet the farm**

Let's be honest, very few of us are ready to accept the full truth of random events. If a coin toss comes up heads 100 times in a row, we "just know" that the next toss is going to be tails. It's in our DNA to believe in a cosmic balance. Unfortunately, this is just not the way the universe works. Streaks start and end in a random and unpredictable way. If you ignore this, you will lose.

### **Casinos expect some friendly cheating and are tolerant of it**

If you think the casino will excuse your cheating, you're sadly mistaken. Don't do it especially in a foreign country. Counting cards in your head isn't illegal, but there are lots of other schemes that are. If you practice them, you will end up in the clink.

### **In the end, all casino games are the same**

Not true. Blackjack gives you the best chance of winning of any casino game. A house edge of 0.5% is the best you are going to find anywhere in the

casino. The absolute genius of blackjack is that it allows players to lose slowly and win suddenly.

### **The effect of bad table rules or not knowing how to play is small**

The effects of bad table rules and inadequate basic strategy skill is not as great as luck, but they can devastate a player's game. Additionally, luck is going to turn eventually. What's lost due to bad table rules and inadequate basic strategy skill is gone forever.

### **Blackjack is a boring game fit only for experts**

Blackjack is fun for everyone! The casino lights, the card play, the free drinks, the interesting people, the shared excitement of winning and losing -- it can be exciting especially if you are winning!

## **Good Advice**

### **Learn basic strategy**

Playing the odds is the only way to succeed over the long term. Basic strategy is the starting point for any player determined to win, or at least determined to survive a few hours of play. Most recreational players can learn enough basic strategy in an hour or two and reduce their handicap to a reasonable 1 or 2% of the bet total.

### **Have a gameplan**

As with any game of skill and knowledge, you will have an advantage if you prepare for your blackjack play. Your plan doesn't need to be elaborate or even written down. It simply needs to bring together what you know about the game and the particulars of the table you've targeted. Knowing when you're going to play, for how long, and your average bet are important elements of any gameplan.

### **Gather intelligence**

Find out the table minimum and the table rules for the blackjack game you want to play. A player can do this by casually strolling through the casino and reading the printing on the tabletop, reading the table's placards and signs, observing play for a few minutes, or by talking to an idle dealer.

You also can estimate your skills handicap by testing yourself with an online game without using the basic strategy charts. Be honest, a skills handicap can easily exceed the house edge.

## **Calculate your required bankroll and your profit goal**

Use the Rule of 33 (33 times your average bet) to calculate the amount you need to bring to the table. Use the Rule of 33 to calculate your profit goal and leave the table when this is reached...if you have the discipline.

## **Refresh your knowledge of the basic strategy decisions**

Refresh your knowledge of basic strategy before each game. There won't be time to ruminate at the tables. Print out a copy of the basic strategy decisions for the table rules you will be playing with and study it until you have committed it to memory. Then have someone test you. Unless you have a photographic memory, this refresher is necessary to avoid costly mistakes.

## **Prepare yourself physically and mentally for the contest**

If you are tired or you have been drinking or something is bothering you, don't play. Throwing away your money is not going to help.

## **Be ready for ups and downs**

No one sits down at a table and just wins or just loses. Your pile of chips is always going up and down in an irregular and unpredictable way. If you make decisions based on the size of your bankroll, either in the long-term or the short-term, you will lose.

*[Trust the numbers, not your emotions. It's natural for players to act one way when they are winning and elated, and to act differently when they are losing and depressed.]*

*Successfully fighting this instinct is what separates winners from losers. Ed.]*

### **Rely on your exit strategy**

Calculating a game plan, especially an exit strategy, is the easy part, sticking with it is what's hard. How many of us will have the discipline to walk away when we're winning? It's all about perspective. The player with a moderate bankroll would be ecstatic to double his money before starting to play. Once the winnings are in his pockets, however, his mind replaces that sensible thought with one that screams, "I CAN'T LOSE!" A good quantitative analysis takes the emotion and relativism out of the equation.

### **Forget rain-dance play**

Betting in streaks, randomly increasing or decreasing your bet, playing multiple hands, hopping from table to table, taking frequent breaks, and many other examples of rain-dance play have absolutely no impact on the outcome of your game. What these shenanigans can do is disrupt your calculations, derail your carefully laid game plans, and screw with your head. Once this happens, you're at the mercy of the cards.

### **Forget about being responsible**

Playing to "responsible limits" takes away your statistical advantage. Most people come to the casino with a certain amount of money that they've earmarked for gambling. They are disappointed if they lose it, but also feel comforted by their mature behavior in setting a responsible and affordable mad-

money limit. Such smugness is irrational -- the odds don't care how responsible a person you are. Setting aside too little for a bankroll is just another way to make a generous contribution to the casino. Stick with the calculated game plan and don't let your personal values, good or bad, get in the way.

### **Don't change the rules halfway through the game**

You can't fool the numbers by hiding your winnings. Gamblers have lots of strange habits, like pocketing winnings for "safekeeping" midway through a gambling session. Not only is this unlikely to work as a psychological crutch, but it also ignores the fact that your bankroll is going to move up and down during a session. If you really do not intend to re-bet your pocketed winnings, then recalculate a new playing strategy after you have secured what you do not intend to bet.

### **Pay attention to the game**

Distracted players make lots of mistakes. That's real money you're playing with. Allowing yourself to be distracted during a game can lead to big mistakes and greatly reduce your chances of having a winning session. The same goes for alcohol, drugs, and any other influences that can reduce your ability to think clearly and make good judgments.

### **Decide on your betting strategy**

You need to decide what kind of bettor you want to be. Some people bet flat, that is, the same amount each time. This is somewhat boring, but it allows the player to have an accurate estimate of the average

bet. Other players bet random amounts, which makes managing your play more difficult.

Another thing to remember about changing the size of your bet is that the casino's security guys are always watching. Card-counters win by increasing the size of their bet when the cards are in their favor. This is one of the clues used by the casino to ferret them out. If you decide to suddenly increase your bet on a hunch, you too can look like a card counter especially if by some miracle, you keep winning. Do this too often and the management will ask you to leave.

### **Loosen up and have fun**

Players who are too intense can make big mistakes.

If you're properly prepared, you will win half as many sessions as you lose over the long run -- guaranteed! Sometimes the wins will be big and that makes the experience fun and hugely exciting. This is the reason you're playing the game, remember?





## GLOSSARY OF TERMS

The following words and phrases are frequently used in blackjack.

Bankroll	The cash a player sets aside to play with.
Betting circle	The circle or square in front of the player in which the player places chips to make a bet.
Bet, original	The original bet is the first bet made by the player to receive cards from the dealer.
Bet, double	The double bet is the bet, usually equal to the original bet, the player makes when he doubles or doubles down. Players can also double-for-less than the original bet.
Bet, split	The split bet is the bet, equal to the original bet, the player makes to split his hand into two hands. Split bets are always equal the original bet.
Bet, insurance	The insurance bet, which is equal to or less than the original bet, allows the player to insure his original bet against a dealer's blackjack. If the dealer has blackjack, the payoff on the insurance bet is 2:1 and the insurance bet is returned; however, the dealer takes the original bet, which means the player breaks even. If the dealer does not have blackjack, the dealer takes the insurance bet and play continues.
Betting system	A betting system or progressive betting system is a pattern of betting intended to minimize losses and maximize gains. They don't work because player's bankrolls are not infinite, and all tables have betting limits.

Blackjack	Blackjack (or twenty-one) is the name of the game. Blackjack is also the term used when the point value of the player's or the dealer's first two cards equals 21. This can happen only when the two-card hand contains an ace, worth 11 points, and a 10-point card such as a ten, jack, queen, or king.
Board counting	Making decisions based on the cards on the table.
Break	Same as bust, but usually applied to the dealer.
Bust	A player or dealer busts when the point value of his hand exceeds 21. Busting the hand for the player or the dealer.
Color up	The process of exchanging low-value chips (of one color) for higher-value ones (of another color) which occurs when a player leaves the table.
Cut card	A plastic card the dealer uses to cut the multiple decks in the shoe and to mark the end of the deal for the shoe. The cut card is usually placed about three-quarters of the way into the multiple decks to make card counting harder. Sometimes there's a small notch in the shoe for where the cut card is to be inserted.
Double	The player wants to double his bet and receive one additional card (aka, double down and doubling down).
Edge	See house edge.
Even money	Even money is the 1:1 payoff offered by the dealer to a player when the player has blackjack and the dealer's face-up card is an ace. This even money payoff of \$1 for every

\$1 bet replaces the normal blackjack premium (usually 3:2). The idea behind even money is that the player should earn something for his blackjack. If the player refuses even money and the dealer has blackjack, it's a tie (a push) and the player earns nothing. The term "even money" also can refer to the 1:1 payoff ratio, which the dealer pays the player when the player wins on points or other 1:1 payoffs.

Hard hand	A hand with no aces.
Hit	The player wants another card from the dealer.
Hole card	The dealer's face-down card.
House	The casino.
House edge	The advantage the casino has over the player, usually expressed as a percentage.
Insurance	The opportunity for the player to protect his/her bet against a dealer blackjack.
Insurance line	The semicircular space on the blackjack table where players place their insurance bets.
Payoff	The payoff is the amount paid by the dealer to the player when the player wins. It is usually expressed as a ratio such as 1:1, which means the dealer will pay the player \$1 for every dollar bet. A 3:2 payoff (paid for blackjack) means the dealer will pay the player \$3 for every \$2 bet. The dealer returns the player's bet to the play in addition to the bet's payoff amount.
Peek	A dealer peeks at or checks the value and rank of his face-down card if his face-up card is an ace or a 10-point card. He does this to

	determine if he has blackjack with his face-down card.
Penetration	The degree to which the dealer places the cut card in a multi-deck shoe.
Point value	Point value is the numerical value of a card or the hand when the hand's cards are added together.
Push	A push is a tie which occurs when the point value of the player's hand the dealer's hand are equal. If a push occurs, the dealer "pushes back" the player's original bet or any double or split bets made on the hand.
Rake	The commission taken by the house when the wager is between players like with poker or horse racing.
Rank	The card's position in the deck's hierarchy (2, 3, 4...king, ace).
Risk of ruin	The risk of losing a bankroll.
Soft hand	A hand with an ace which can have one or eleven points.
Split	The player wants to split his/her pair into two hands.
Stand	The player does not want any more cards.
Std. deviation	The average distance of an outcome from the mean of all outcomes. In blackjack, when measuring profits and losses after each hand, the standard deviation value is 1.4 to 1.7, depending on rules.
Steering	A trick used by cheaters to place a particular card or a marked card at the top of the shoe.

Suit	Suit is one of four card groups -- hearts, clubs, spades, and diamonds. A card's suit is irrelevant in blackjack, although it may apply with some side bet games.
Surrender	Player wants to end his hand and keep one-half of his bet.
Third base	The player position immediately to the right of the dealer. This is a problematic place to sit as the third baseman's decisions affect the cards the dealer receives causing some players to lose the hand.
True odds	Odds unaffected by any adjustment, such as the house edge.
Twenty-one	Twenty-One (or blackjack) is the name of the game.
Up card	The face-up dealer's card.



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