

King High (Six Decks)

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Introduction

This report analyses the proposed casino game King High, for the situation where six decks are used, either manually dealt from a shoe, or from a continuous shuffling machine. The report is concerned with the return to the player from the various bets available in the game.

Brief Description of Game

Cards are dealt in groups of 5 onto the table. The deck is shuffled after each hand of five cards. The player has several bets available. The first three bets are available before each individual card is drawn.

- High/Low: the player bets that the card drawn will be high (8 to King) or low (Ace to 6).
- Suit: the player bets that the card will be a particular suit, such as Clubs.
- Seven: the player bets that the next card will be a 7.
- Field: the player bets that the next card will be a 4,5,6,8,9,10 or the King of Hearts

The remaining bets are available only before the group of 5 cards is dealt.

- Run bet: the player bets that the next cards drawn will be a sequence of 3, 4 or 5 low (or high) cards.
- Jackpot bet: these bets win if certain poker hands are dealt.

Manual vs Machine shuffling

The results below are based on dealing four hands from a shoe, after which all cards are shuffled before dealing another hand. In general, this means that we can have four somewhat different results for the player, depending on whether bets are made on the first, second, third or fourth hands dealt from the shoe.

If a continuous shuffling machine is used, only five cards should be out of play at any time. In this case, after the first hand dealt in a session, all subsequent hands provide the same odds as the second hand in the manual dealing case. If ten cards are out of play, then the situation is precisely the same as the third hand in the manual case.

High/Low Bet

Winning bets are paid at even money, except that a low bet pays 3 to 2 on an Ace and a high bet pays 3 to 2 on a King. If card is seven, all bets lose.

It is obvious, even to a novice player, that after several high cards have been drawn the odds favour a low card to be drawn next, and vice versa. We assume that a novice player bets on every card, and bets high or low based on the previous cards dealt in this hand. No memory of previous hands is assumed. The return to player in this case is 96.5% on all hands

A more astute player might be capable of counting high and low cards from the beginning of the shoe. He bets only if there is a marked imbalance in low and high cards. A typical strategy would be to bet if five more low cards have been counted than high cards, or vice versa. The return to the player is shown in the simple table below.

Hand	1	2	3	4
RTP	-	98.0	98.2	98.3

As noted above, column 2 provides the result for continuous shuffling.

Suit Bet

Here the player bets that the next card drawn will be a particular suit. The standard payout will be at 3:1, but the win is reduced if the card is a seven, either to even money or to a standoff. Both of these cases are analysed.

It is obvious, even to a novice player, that it is best to bet on a suit which has not yet appeared in this hand. Assuming that a player generally follows this strategy, but bets on every card, the RTP is 96.7% if sevens are paid at even money, but reduces to 94.8% if sevens are a standoff.

With manual shuffling and sevens paid at even money, this bet is open to exploitation by a player who is capable of watching all four suits from the beginning of the shoe. A typical strategy by such a player would be to bet after the first hand on a suit which has not yet appeared (if any). The table below shows the RTP for each successive hand using both pay patterns.

Hand	1	2	3	4
7s Even	-	96.8	100.0	101.7
7s Standoff	-	96.3	97.9	99.4

Manual shuffling after four hands is not viable with the more generous payout.

Seven Bet

A successful bet pays at 11:1. A straightforward player bets on every card. The RTP is 92.3%.

A player can do better by betting only when the shoe is somewhat richer in sevens. A typical strategy would be to bet only after the first hand, and only if no seven has shown up since the last shuffle. The table below shows the RTP for each hand using this strategy.

Hand	1	2	3	4
RTP	-	94.3	95.9	97.5

Field Bet

This bet wins if the next card is a 4, 5, 6, 8, 9, 10 or the King of Hearts. Payoff is always at even money. If a player bets on every card, the payoff is 96.2%.

A player can do better by betting only when the shoe is richer in the field cards. A typical strategy is to bet only after the first hand, and only if the number of field cards dealt is at least 5 less than the number of other cards. The table below shows the RTP for each hand using this strategy.

Hand	1	2	3	4
RTP	-	97.7	98.0	98.1

Run Bet

This bet and the jackpot bet can be made only before the first card in a group of 5 is dealt. Bets are available on a run of three low (or high cards). The bet is successful if a run of three or more of the specified cards is dealt immediately. Two different payout patterns have been analysed

Option	Run of 3	Run of 4	Run of 5
A	4:1	9:1	20:1
B	3:1	10:1	20:1

A simple player betting on every hand has a return of 93.0% in Option A and 90.1% in Option B.

A player can do better by betting only when there is a marked imbalance in the number of high and low cards remaining in the shoe. This requires counting the high and low cards

from the beginning of the shoe. A typical strategy would be to refrain from betting on the first hand, and on subsequent hands to bet only when the difference between the number of low cards and the number of high cards is at least 5. Of course if many low cards have appeared, the player bets on a high run, and vice versa. The table below shows the return to the player from each hand when using this strategy. Both payout patterns are shown

Hand	1	2	3	4
A	-	98.5	100.3	101.0
B	-	95.7	97.4	97.8

The table shows that the more generous payout pattern is not viable with manual shuffling after three hands.

Jackpot Bet

We assume the following table of payouts.

Hand	Payout
Jacks or better	1
2 pair	2
3 of kind	3
Straight	5
Flush	10
Full House	15
4 of Kind	50
5 of Kind	500
Straight Flush	1000
Royal Flush	2500

In this case the return to player is 87.1%.

With six decks, a straight a flush and a full house all occur with roughly the same frequency. This means that rearranging those payouts makes only a small difference. If the payouts for straight & full house are interchanged, the RTP becomes 87.4%.

If the even money payout is extended to tens or better, instead of jacks or better, this makes a substantial difference. The RTP then becomes 94.1%.