Mathematical Analysis
Of
Packs Poker Keno

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Prepared
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Packs Poker Keno is a lottery game played using a computer-generated random deal of 16 cards from a standard 52-card deck, in which players try to beat a computer-generated "dealer" hand with the best 5-card poker hand that can be formed from their 5-card hand and 2 community cards. The community cards are divided into three 2-card "packs", and the player may bet on any or all of these packs. For each Pack bet, each player and the "dealer" may use the community cards from the corresponding pack along with the cards they are individually dealt, to form a 5-card Poker hand. Player hands of Straight or better automatically win bonus payouts. Players who beat or tie the dealer hand but do not achieve a Bonus hand receive a 1 for 1 payout (the amount they bet on the corresponding Pack). The game can be played with a variety of Pay Tables for the bonus payouts.

After choosing which packs to bet on before the cards were dealt, the player does not fold or raise or make any other decisions.

The computer determines the best 5-card poker hand that can be made from the player's 5-card hand and the 2-card pack of community cards, and the same for the dealer's hand. If the player's hand is a Straight or better, or he beats or ties the dealer's hand, the bet is paid according to the following paytable (other paytables) are shown in the Appendix to this report):

<div align="center">

7-card Royal Flush: $2,000 (fixed payout)

6-card Royal Flush: $500 (fixed payout)

5-card Royal Flush: 250 for1

Straight Flush: 50 for 1

4 of a Kind: 10 for 1

Full House: 4 for 1

Flush: 3 for 1

Straight: 2 for1

Beat or Tie Dealer: 1 for 1

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The payouts shown are on a "for 1" basis: the money the player used to purchase his ticket does not come back.

This game was analyzed using combinatorial mathematics, along with a computer simulation of 52,000,000 deals to estimate the frequency of the player beating or tying the dealer with less than a Straight.

There is no folding or raising and no strategy: this is a game of chance and not a game of skill. Each pack on which the player bet is independently used to by the computer to compare the best 5 out of 7 cards for the player and the dealer, and to evaluate the best hand the player can make using that pack, against a pay table.

<p style="text-align:center">Summary of Results:</p>

Because the payouts for 7-card and 6-card Royal Flushes are fixed dollar amounts, the House Edge Percentage varies depending on the player's bet. For a $1 unit bet, with the given pay table ($2,000/$500/250/50/10/4/3/2/1) the House Edge is **27.20%** of a unit wager or $0.272. In practice the House Edge will be the same as the theoretical advantage because the player makes no decisions and so cannot play worse than optimally (whether he bets on 1, 2, or 3 packs has no effect on the percentage of money the House wins).

Results for other pay tables are shown on the following pages.

Assumes player gets a single payment if he either gets a straight or better or beats or ties the dealer.

	Ticket price:	$1.00												
7-card Royal	4	0.00000003	2000	2000	1000	2000	1000	1000	500	1000	1000	2000	1000	1000
6-card Royal	180	0.0000013	1000	500	500	500	500	500	250	500	500	1000	250	500
Royal Flush	4,324	0.0000323	600	250	200	200	500	250	125	250	500	500	250	250
Straight Flush	37,260	0.0002785	50	50	100	50	100	100	50	50	100	200	50	100
Four of a Kind	224,848	0.0016807	10	10	10	5	20	20	10	10	25	20	25	25
Full House	3,473,184	0.0259610	4	4	4	4	4	5	5	5	5	5	10	10
Flush	4,047,644	0.0302549	2	3	3	3	3	3	4	4	4	4	3	3
Straight	6,180,020	0.0461938	2	2	2	3	2	2	3	3	3	3	2	2
Beat/Tie Dealer	from sim	0.4014750	1	1	1	1	1	1	1	1	1	1	1	1
	133,784,560													
		House Edge	29.03%	27.20%	25.97%	23.58%	23.32%	21.53%	17.40%	16.96%	12.24%	10.22%	9.14%	7.71%