

The 27 Card Trick

The Trick (basic)

1. The participant chooses a random card from a deck of 27, memorises it, replaces it, and shuffles the deck as much as desired.
2. The dealer creates three face-up piles of nine cards, dealing the top card onto the left, middle, then right deck and repeating until all the cards are gone.
3. The participant then points to which pile contains the chosen card.
4. The dealer then re-stacks the piles into a new deck putting the pile that contains the participant's card in the middle.
5. Steps 2-4 are repeated twice.
6. The dealer then flips over 13 cards from the top and reveals the 14th card to be the original chosen card.

The Trick (advanced)

1. The participant chooses a random card from a deck of 27, memorises it, replaces it, and shuffles the deck as much as desired. The participant also states a random number between 1 and 27 (call this number n).
2. The dealer creates three face-up piles of nine cards, dealing the top card onto the left, middle, then right deck and repeating until all the cards are gone.
3. The participant then points to which pile contains the chosen card.
4. The dealer then re-stacks the piles into a new deck. The dealer must maintain the order of the specific piles themselves however.
5. Steps 2-4 are repeated twice.
6. The dealer then flips over $n-1$ cards from the top and reveals the n th card to be the original chosen card.

How does the basic version work? How does the advanced version work? For the latter, try to work out how the card trick works with

- a) 8 cards and two piles dealing 3 times (doing steps 2-4 3times). Which card needs to be revealed at the end if in step 4 the pile that contains the participant's card is first put on top then put at the bottom for the remaining two times?
- b) 4 cards and two piles dealing twice (doing steps 2-4 twice)
- c) 9 cards and three piles dealing twice (doing steps 2-4 twice)
- d) How does the trick work with 32 cards and 4 piles? How many times do you need to do steps 2-4? In which order do you need to put the piles in steps 2-4 so that at the end the 12th card is the participant's card?