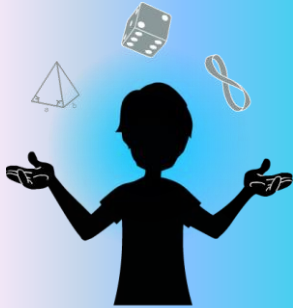


MATHEMAGIC

-THE CALL-



AMAZINGMATHS

Materials:

- Magic trick video
- 6 playing cards

How to do the Magic Trick

Goal:

Find the spectator's card.

Preparation:

Select 6 cards from a deck of cards.

N.B. To make it easier for the students to understand, it is advisable to select figures (Kings, Queens and Jacks) to prevent students from mixing the cards' value and position.

Trick:

1. The magician places 6 cards into 2 piles of 3 cards on the table. He asks the spectator to choose one of the two piles.
2. The magician asks the spectator to choose a card from the three cards of the chosen pile and place it on top of that pile.
3. The magician takes the pile that was left on the table (the one not chosen by the spectator) and places it on top of the spectator's pile.
4. The magician places the 6 cards into 2 piles of 3 cards on the table, alternating cards from one pile to another.
5. The magician "calls" a pile to find out if the spectator's card is there. The card is not there. The magician puts the pile aside.
6. The magician takes the remaining pile and distributes it on the table to form 2 piles, alternating cards from one pile to another.
7. The magician "calls" a pile to find out if the spectator's card is there. The cards in the pile tell him that the spectator's card has escaped! The magician takes the card that remains on the table and shows it to the spectator. It is indeed the spectator's card!



MATHEMATICAL EXPLANATION



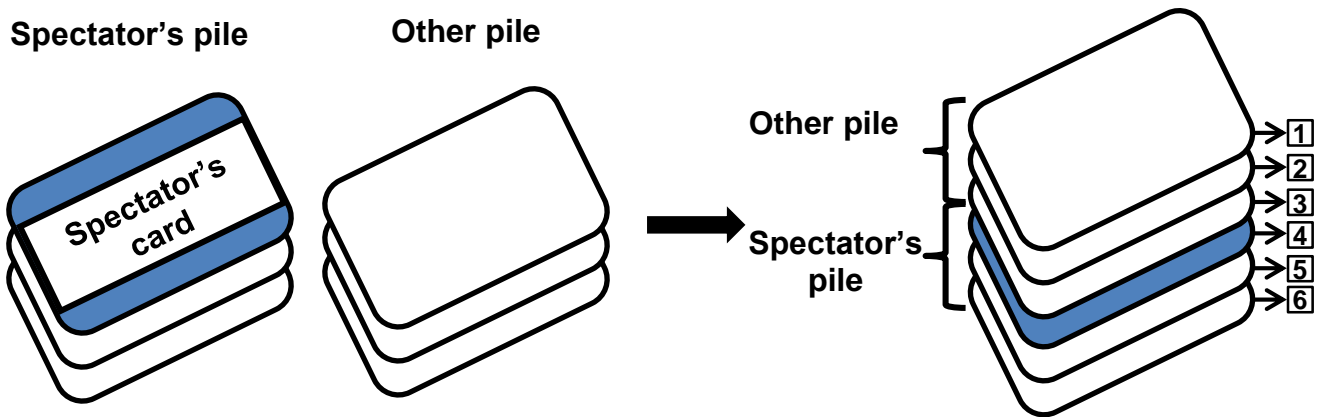
Why This Trick Works.

At the beginning, the spectator chooses a card from his favourite pile and places it **on top of** the same pile.

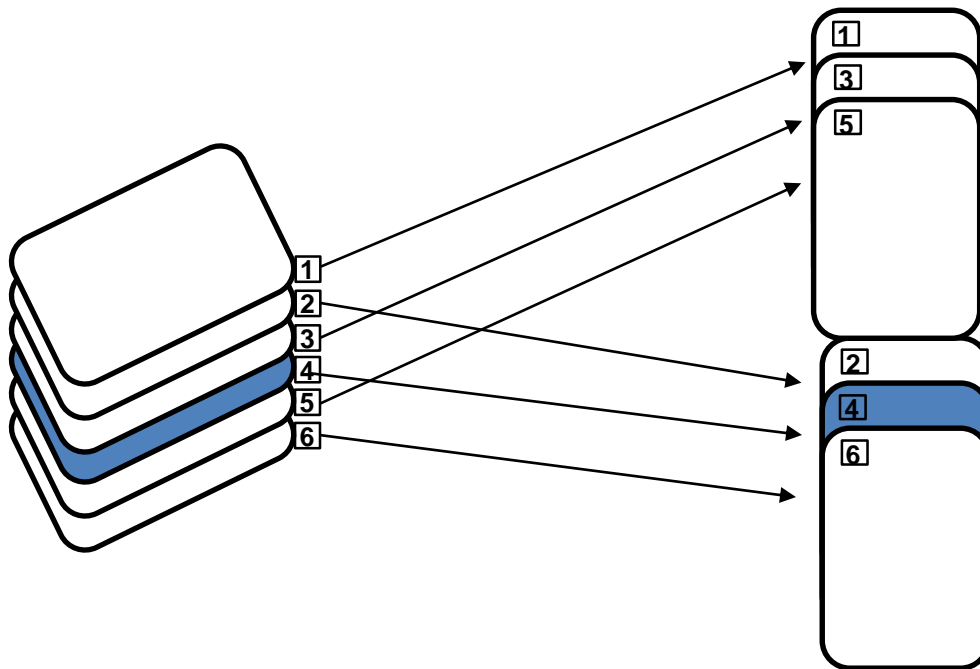
Then, the magician places the other pile over the spectator's chosen pile. So, the spectator's card ends up in the 4th rank from the top among the 6 cards that the magician has in his hands.

Spectator's pile

Other pile



When the magician distributes the cards into two piles on the table, he proceeds by alternating cards from one pile to another. This way of doing results in a particular layout of the cards: they are placed in a pile according to the parity of their rank before the distribution. Thus, cards that had an even rank before the distribution end up in the same pile and cards that had an odd rank before the distribution end up in the other.



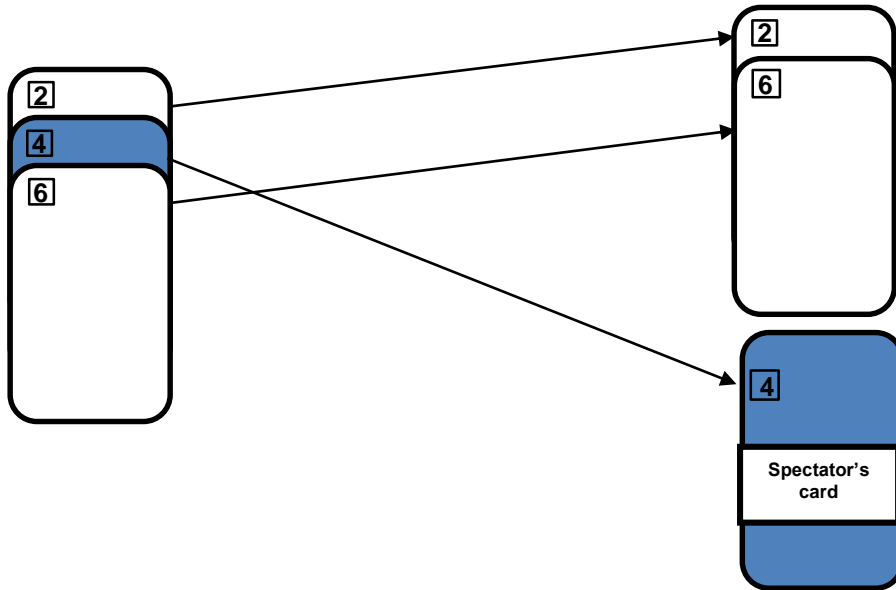
The pile on which the magician places the last card (card 6) is the **same pile** as the pile in which the spectator's card is. He therefore knows that the other pile does not contain the spectator's card so, he puts it aside.



MATHEMATICAL EXPLANATION



Then, the magician takes the remaining pile and redistributes it into two other piles.



Since the spectator's card is in the middle of the pile, when the magician proceeds to the second card distribution, it ends up alone in its pile after the distribution.

The magician therefore knows that the pile with 2 cards does not contain the spectator's card. He can therefore put that pile aside and turn over the only card left on the table. It is the spectator's card!