MATHEMAGIC

- REUNITED -

AMAZINGMATHS

Materials:

- Video of the trick
- 15 cards (3 piles of 5 cards of a same suit)
- Sheets of paper

How to do the Magic Trick

Preparation:

We use 3 piles of 5 cards of the same suit (for example: 5 cards of hearts, 5 cards of pikes and 5 cards of tiles)

Trick:

1. The magician indicates to the spectator that he placed the 3 piles one above the other.
2. The magician divides the cards into 5 piles of three, by first placing 5 cards side by side on the table, then covering them with the next 5 and repeating this operation.
3. The magician asks the spectator to gather the 5 small piles in the order of his choice, then to cut the deck as many times as he wants.
4. The magician asks the spectator to look at the card on the top and set it aside.
5. He then takes the 14 remaining cards and places them on the table into 7 piles of two, each pile formed by the card on top and the one on the bottom of the deck of 14 cards.
6. He selects the third and the sixth pile and turns them over. We note that the 4 cards are all of the same suit and that the fifth card of this suit is the card taken by the spectator!

MATHEMATICAL EXPLANATION

Why this trick works.

At the beginning, the deck is made up, from the top-down, of the 5 cards of tiles, the 5 cards of pikes and finally the 5 cards of hearts.

When the magician divides the cards into 5 piles of 3 cards, he first places the 5 cards of tiles. On each card of tiles, he places a card of pikes, then a card of hearts.

So, each small pile is made up of three cards in the following order, from the top-down: hearts, pikes, tiles.

By gathering the piles, we get 15 cards of which the suits alternate in the same way: hearts, pikes, tiles, hearts, pikes, tiles, hearts, pikes, tiles… The order remains the same once the spectator cuts the deck of cards.

We remove the card on top. Let's suppose it is a card of hearts. There are then 14 cards left. We can number the positions starting from the top. So, card 1 is a card of pikes, card 2 is of tiles, card 3 is of hearts and the sequence repeats itself. The cards of hearts are all placed in positions with multiples of 3.

When the magician makes the piles of 2, he first takes the cards in positions 1 and 14, then the ones in positions 2 and 13, and so on. He forms the 7 following pairs: 1 and 14, 2 and 13, 3 and 12, 4 and 11, 5 and 10, 6 and 9, 7 and 8. The pairs formed with the cards in positions 3-12 and 6-9 only have multiples of 3, so only cards of hearts.

With the starting card, which was also of hearts, all the cards of this suit are reunited!

NOTE: The example here is done with cards of hearts, but the explanation is valid for every suit. The idea is simply that the cards of which positions are multiples of 3 (so that form the third and the sixth pile) will always be of the same suit than the card on top that was removed, which we could say was in position 0.