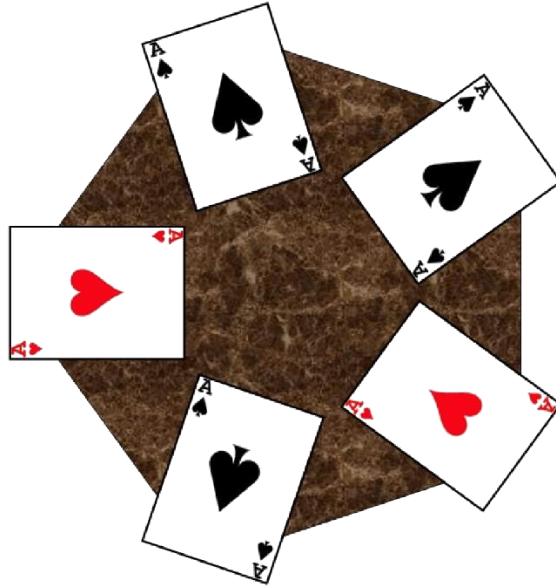




Fashions come and fashions go, but the guru who starts a new fashion trend always takes a risk. One way to lessen this risk is to find if your best friend agrees with your new fashion idea. The problem is that you risk humiliation if your friend thinks your idea is stupid. Your friend also doesn't want to admit to liking a fashion that you think is stupid. Mathematics solves this problem...

Zara and Chloe want to check if they agree on a new fashion trend, without revealing their own preferences if they disagree.

1. Zara and Chloe first get 3 identical "ace of spades" cards and 2 identical "ace of hearts" cards.
2. Zara and Chloe draw or talk about a fashion idea. (It can be one that they secretly like or hate)
3. Zara and Chloe each take an ace of spades and an ace of hearts. The remaining ace of spades is put face down on the table.
4. Zara places her two cards face down on top of the ace already on the table. If she likes the fashion idea, she first places her ace of spades first and then her ace of hearts on top. If she does not like the fashion idea, she first places her ace of hearts and then places her ace of spades.
5. Chloe places her two cards. If she likes the fashion idea, she first places the ace of hearts, and then places the ace of spades. If she does not like the fashion idea, she first places the ace of spades and then places the ace of hearts.
6. Both players may cut the five cards as often as they like (cutting means taking some of the cards from the top of the deck and putting them on the bottom of the deck without changing their order).
7. Starting with the top card, place the cards clockwise in a circle.
8. Zara and Chloe should repeat steps 2 through 7 with different fashion ideas. Otherwise it is too obvious. Both Zara and Chloe must also keep a straight face.



- Describe the circle of cards if Zara & Chloe both like a fashion idea? Describe the circle of cards if only Zara likes the fashion idea? Describe the circle of cards if only Chloe likes the fashion idea?
- Describe the circle of cards if Zara & Chloe both do not both like a fashion idea?
- Why does this solve the embarrassment problem in choosing a fashion that Zara & Chloe both like?

Extensions:

- Would it work if the Chloe was given a king of hearts instead of an ace of hearts?
- Six adults are out for a walk in the autumn. Three of them would love to run through the leaves and climb trees together, but they are too embarrassed to let the more mature adults know this. How can the three of them find each other without any of the remaining three finding out?

The Math in This Problem:

In this math puzzle, students will experiment with playing cards and be introduced to the idea of cryptography, which is the practice of hiding information through secret codes. It is related to disciplines, such as mathematics, computer science, and engineering, and is the foundation for building applications, including computer passwords and debit cards.