TWO ACES

For this activity you need six cards, four Aces and the Jack of hearts and Queen of spades. If playing cards are not available, then make some coloured cards instead. (See the Two Red Cards version below)
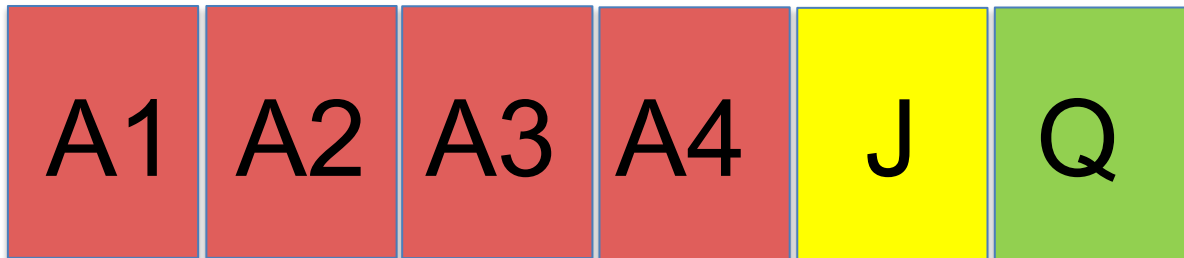

You pick 2 cards at random and tell me "I have an Ace". What is the probability that you have two aces?

Next suppose I pick 2 of the 6 cards at random and tell you "I have the Ace of spades". What is the probability that I have two Aces?

Are these two probabilities of two Aces the same? Explain your answer.

TWO RED CARDS

We have six cards, four red cards and one yellow card and one green card.

You pick 2 cards at random and tell me "I have a red card". What is the probability that you have two red cards?

Next suppose I pick 2 of the 6 cards at random and tell you "I have the A1 card". What is the probability that I have two red cards?

Are these two probabilities of two red cards the same? Explain your answer.

HELP

Try to answer questions (1) and (2). Only study the answer below if you can't do it yourself. If possible, discuss it with someone else and help each other. When you understand this family example then answer questions (3) to (9) below to solve the Two Aces problem.

(1) You meet a mother who tells you "I have 2 children" and you know one of them is a boy. What is the probability that her other child is a boy?

(2) Now suppose she tells you "I have 2 children and the oldest is a boy," What is the probability that the other one is a boy?

Case (1) The possible families are BB, BG, GB so the probability that the other child is a boy is $\frac{1}{3}$.

Case (2) The possible families are BB, BG so the probability that the other child is a boy is $\frac{1}{2}$.

(3)   How many different pairs of cards are there if you choose two cards from the six cards? Make a list of all the possibilities.

(4)   How many of those pairs contain one or more Aces (red cards)?

(5)   How many of those pairs have 2 Aces (2 red cards)?

(6)   If you have already picked 2 cards and one is an Ace what is the probability that both are Aces?

(7)   How many pairs contain the Ace of spades (A1 card)?

(8)   If you have already picked 2 cards and one is the Ace of spades (A1) what is the probability that both are Aces?

(9)   Are the answers to questions 2 and 6 the same? If not, why not?

NEXT

(1) You meet a mother who tells you "I have 2 children" and you know one of them is a boy. What is the probability that her other child is a boy?

(2) Now suppose she tells you "I have 2 children and the oldest is a boy," What is the probability that the other one is a boy?

Make up a similar problem to this for a family of 3 children.

Cut out these cards or make your own set.

| A1 | A2 | A3 | A4 | J | Q |