Chapter Project

Should You Play the Hand You're Dealt?

This project is designed to be completed by groups, but an individual may complete it. Each group should have one standard deck of cards to use as directed.

Rules for Poker

Using a standard deck of 52 cards, the players are dealt cards depending on the exact type of poker game being played. For the purpose of this project, players will be dealt 5 cards. Card values and scoring can be found at www.bicyclecards.com/how-to-play/basics-of-poker/.

Part 1: Understanding the deck.

a. What is the probability of getting a queen?

b. What is the probability of getting a four?

c. What is the probability of getting a five?

d. What is the probability of getting a ten?

e. Does it matter which card value that is picked?

f. What does this tell you about the probability of drawing any particular card value from the deck?

g. Now consider how many different 5-card hands that can be dealt. Does order matter in getting these cards?

h. Remember that when order matters use a permutation and when order does not matter use a combination. So, would you use a permutation or a combination to determine the number of 5-card hands that can be dealt from a deck of 52 cards?

i. Based on your answer to the previous question, determine the number of 5-card hands that can be dealt from a deck of 52 cards.

Part 2: What is the probability of getting more than one of the same card in a 5-card hand?

a. What is the probability of getting a pair of some kind, such as a pair of fours, out of five cards

b. What is the probability of getting three of a kind, such as three fours, out of five cards?

c. What is the probability of getting four of a kind, such as four fours, out of five cards?

Part 3: Classroom Activity

Create small groups of four or less. Take a standard deck of cards and shuffle it well. Deal each person five cards.

a. How many people got a pair?

b. How many people got three of a kind?

c. Did anyone get four of a kind?

d. How does this help your group understand the probabilities from Part 2?

Part 4: Let's look at the probability of getting two pairs. This is two different numbers paired up, such as 3, 3, 7, 7, 9.

a. Would you use a permutation or a combination to determine the probability of getting a 5-card hand that contains two pairs?

b. Determine the probability of getting two (different) pairs in a 5-card hand.

Part 5: Let's look at the probability of getting a full house. A full house is three of one card and a pair of another card such as 8, 8, 8, 4, 4. Determine the probability of getting a full house.

Part 6: Let's look at a very special hand, the Royal Flush, which is getting an A, K, Q, J, and 10 all of one suit.

a. How many ways can you get a Royal Flush?

b. What is the probability of getting a Royal Flush?

Part 7: When you have all 5 cards from the same suit in a sequence, such as 3, 4, 5, 6, 7, this is called a straight flush.

a. How many ways can you get a straight flush in a 5-card hand?

b. What is the probability of getting a straight flush?

Part 8: Let's look at a flush, which is getting all five of one suit such as 2, 4, 6, 7, 10, of any one of the four suits. Now we want to just look at flushes, not flushes that happen to also be straights since a straight flush is itself a certain kind of hand.

a. What is the probability of getting a flush?

b. Let's look at a straight that is not also a flush, which is getting all five in a row of any suit such as 4, 5, 6, 7, and 8 no matter what suit they came from.

c. What is the probability of getting a straight?

Part 9: Conclusions

a. So, what have you learned from this project about playing poker with a 5-card hand and will it influence how you bet in the future when playing?

b. Is the probability in your favor of getting the hand you want?

Source: https://www.bicyclecards.com/how-to-play/basics-of-poker/