

Name: _____

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Data 88S

Feb 7, 2024

1. Suppose a hand of 5 cards is dealt from a standard 52 card deck. What is the chance of the hand having 2 hearts and 3 clubs?
2. A flush in poker is 5 cards of the same suit (all spades, all hearts, all diamonds, or all clubs), but the five cards cannot be consecutive (e.g., 2, 3, 4, 5, 6 of hearts is a straight flush, not a flush). What is the chance of being dealt a flush from a well-shuffled deck of cards? (Hint: It might be easier to include the consecutive ones and then subtract them from the total.)
3. In a move in the game Monopoly, on a player's turn, a pair of dice is rolled. Let D_1 be the number of spots on the first die, D_2 the number of spots on the second die, and $S = D_1 + D_2$ be the sum of spots on both dice.
 - (a) Write down the distributions of D_1 , D_2 , and S . Is $D_1 = D_2$?
 - (b) Write down the probability mass functions of D_1 , D_2 , and S .

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(c) Find the probability that S is at least 8.

(d) Find $P(|S - 7| \leq 2)$.

4. Suppose X and Y are random variables such that X is the number of heads when an unfair coin is tossed once, where $P(H) = 0.3$. Let Y be the number of heads when a *different* biased coin is tossed once, where $P(Y = 1) = 0.4$. (You may multiply probabilities in this problem since X and Y don't depend on each other.)

(a) Write down pmf for both X and Y .

(b) Write down pmf for $\frac{X^2}{Y+1}$ (Hint: What are the possible values it could take? List them and then figure out the probabilities.)