Probabily Homework

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June 10, 2024

Exercises for Section 5.1

1. A card is randomly selected from a deck of 52 cards. What is the chance that the card is red or a king?
   $|S| = 52$, red $= 26$, kings $= 4$, $|E| = 28$
   $P(E) = \dfrac{28}{52}$

5 Toss a dice 5 times in a row. What is the probability that you will get the same number on each roll?
$|S| = 6x6x6x6x6 = 6^5$, $|E| = \{all1, all2, all3, all4, all5, all6\} = 6$ $p(E) = \dfrac{6}{6^5}$

7 You have a pair of dice, a white one and a black one. Toss them both. What is the probability that they show the same number?
$|S| = 6x6, |E| = \{11, 22, 33, 44, 55, 66\} = 6$
$p(E) = \dfrac{6}{6x6}$

11 Toss a coin 8 times. Find the probability that the first and last tosses are heads.
$|S| = 2^8, |E| = 1x2x2x2x2x2x2x1 = 1^2x2^6$
$P(E) = \dfrac{2^6}{2^8}$

13 Five cards are dealt from a shuffled 52-card deck. What is the probability of getting three red cards and two clubs?
$|S| = C^5_{52}, |E| = C^3_{26}xC^2_{13}$
$P(E) = \dfrac{C^3_{26}xC^2_{13}}{C^5_{52}}$

15 Alice and Bob each randomly pick an integer from 0 to 9. $|S| = 10x10$

- What is the probability that they pick the same number?
  $|E| = 10, P(E) = \dfrac{10}{10x10}$
- What is the probability that they pick different numbers?
  $|E^c| = 100 - 10 = 90, P(E^c) = \dfrac{90}{10x10}$

Exercises for Section 5.2

1. A card is taken off the top of a shuffled 52-card deck. What is the probability that it is black or an ace?
   $|S| = 52, p(black) = \dfrac{26}{52}, p(ace) = \dfrac{4}{52}, p(A \cap B) = \dfrac{2}{52}$
   $p(A \cup B) = 4/52 + 26/52 - 2/52 = \dfrac{28}{52}$

3 What is the probability that a 5-card hand dealt off a shuffled 52-card deck contains at least one red card?
$|S| = C^5_{52}, |E| = C^5_{26}, p(E^c) = 1 - \dfrac{C^5_{26}}{C^5_{52}}$

7 Two cards are dealt off a shuffled 52-card deck.What is the probability that the cards are both red or both aces?
$|S| = C^2_{52}, |A| = C^2_{26}, |B| = C^2_4, |A \cap B| = 1$
$p(A \cup B) = \dfrac{C^2_4}{C^2_{52}} + \dfrac{C^2_{26}}{C^2_{52}} - \dfrac{1}{C^2_{52}}$

11 fff

17 fff

Exercises for Section 5.3

2 fff

4 fff

7 fff

9 fff

11 fff

Exercises for Section 5.5

1. fff
2. fff
3. fff