Assignment 3

PUNDI BINDUSREE
CS21BTECH11048
Papoulis Chapter3 3.2

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Outline

Question

Question

A pair of dice is rolled 50 times.Find the probability of obtaining double six at least three times.

solution

Given there are

1. two dices
2. number of times the two dices rolled be N = 50

solution

Required to find

the probability of obtaining double six atleast three times.

solution

- Let M be the move of a single dice. Then probabiity of single move of a dice = P(M)= $\frac{1}{50}$.
- Probability of obataining a number from 1 to 6 on a single dice = $\frac{1}{6}$

solution

- probability of obtaining double six $= \frac{1}{36}$
- probability of not obtaining double six $= \frac{35}{36}$

solution

- probability of obtaining double six atleast three times = probability of obtaining double six (three times+ four times + ...50 times)

solution

- probability of obtaining double six $n(n < 50)$ times $= \binom{50}{n}$ $\times(\frac{1}{50})^n \times (\frac{1}{36})^n \times (\frac{35}{36})^{50-n}$.

solution

- probability of obtaining double six atleast three times
  $= \binom{50}{3} \times (\frac{1}{50})^3 \times (\frac{1}{36})^3 \times (\frac{35}{36})^{47} + \ldots\ldots \binom{50}{50} \times (\frac{1}{50})^{50} \times (\frac{1}{36})^{50} \times (\frac{35}{36})^0.$
  $= 1 - \binom{50}{2} \times (\frac{1}{50})^2 \times (\frac{1}{36})^2 \times (\frac{35}{36})^{48} - \binom{50}{1} \times (\frac{1}{50})^1 \times (\frac{1}{36})^1 \times (\frac{35}{36})^{49} - \binom{50}{0} \times (\frac{1}{50})^0 \times (\frac{1}{36})^0 \times (\frac{35}{36})^{50}$

solution

- Hence probability of obtaining double six atleast three times $= 1 - \binom{50}{2} \times (\frac{1}{50})^2 \times (\frac{1}{36})^2 \times (\frac{35}{36})^{48} - \binom{50}{1} \times (\frac{1}{50})^1 \times (\frac{1}{36})^1 \times (\frac{35}{36})^{49} - \binom{50}{0} \times (\frac{1}{50})^0 \times (\frac{1}{36})^0 \times (\frac{35}{36})^{50}$