Assignment 6

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Outline

Question Statement

Question: Five cards are drawn successively with replacement from a well shuffled deck of 52 cards.What is the probability that :
(i)All the five cards are spades?
(ii)Only 3 cards are spades?
(iii)None is a spade?

Solution

Solution: X is said to be a binomial random variable. X has parameters n and p ,where n =number of trials and p =probability with which it takes spade card in a draw= $13/52 = 1/4$.

n	5

Table 2

X	1,2,3,4,5

Table 4

X	Event
$X = 5$	getting spade cards in all 5 trials
$X = 3$	3 out of 5 trials get spade cards
$X = 0$	0 out of 5 trials get spade cards

Table 5

$$(i) Pr(X = 5) = \binom{n}{5} \times (1-p)^{(n-5)} \times p^5 \tag{1}$$

$$= \binom{5}{5} \times (3/4)^0 \times (1/4)^5 \tag{2}$$

$$= 0.000977 \tag{3}$$

$$(ii) Pr(X = 3) = \binom{n}{3} \times (1-p)^{(n-3)} \times p^3 \tag{4}$$

$$= \binom{5}{3} \times (3/4)^2 \times (1/4)^3 \tag{5}$$

$$= 0.0879 \tag{6}$$

$$(iii) Pr(X = 0) = \binom{n}{0} \times (1-p)^{(n-0)} \times p^0 \tag{7}$$

$$= \binom{5}{0} \times (3/4)^5 \times (1/4)^0 \tag{8}$$