

AI1110 ASSIGNMENT-8

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Abstract—This document contains the solution for Assignment 8 (NCERT GRADE 12 CHAPTER 13 Example 9)

EXAMPLE 9 :

Three cards are drawn successively, without replacement from a pack of 52 well shuffled cards. What is the probability that first two cards are kings and the third card drawn is an ace ?

SOLUTION :

In a deck of 52 cards there are 4 King cards and 4 Ace cards in total. Let us also define events as in Table I

Event	Description of event
$X = 0$	The drawn card is a King
$X = 1$	The drawn card is an ace
$X = 2$	The drawn card is neither an ace nor a King

TABLE I
DEFINING THE EVENTS

We have to find $\Pr((X = 0)(X = 0)(X = 1))$.

We know that ,

$$\Pr((X = 0)) = \frac{\text{Number of Kings}}{\text{Total number of cards}} \quad (1)$$

$$\Pr((X = 0)) = \frac{4}{52} \quad (2)$$

and , also $\Pr((X = 0)|(X = 0))$ is the probability of second king with the condition that one king has already been drawn . As now ,there are 3 Kings in 51 cards .

$$\Pr((X = 0)|(X = 0)) = \frac{3}{51} \quad (3)$$

Lastly , $\Pr((X = 1)|(X = 0)(X = 0))$ is the probability of third drawn card to be an ace ,with the condition that two kings have already been drawn . As now , there are 4 aces in 50 cards .

$$\Pr((X = 1)|(X = 0)(X = 0)) = \frac{4}{50} \quad (4)$$

By multiplication law of probability ,we have

$$\begin{aligned} \Pr((X = 0)(X = 0)(X = 1)) &= \\ \Pr((X = 0)) \Pr((X = 0)|(X = 0)) & \\ \Pr((X = 1)|(X = 0)(X = 0)) & \end{aligned} \quad (5)$$

$$\Pr((X = 0)(X = 0)(X = 1)) = \frac{4}{52} \frac{3}{51} \frac{4}{50} \quad (6)$$

$$= \frac{2}{5525} \quad (7)$$