Application of Bayes' theorem to related problems

SUBJECT : (MATHEMATICS)
CHAPTER NUMBER: 13
CHAPTER NAME : PROBABILITY

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Application of Bayes' theorem to related problems

Problem-1

The bag I contain 3 Red and 4 Black balls while another Bag II contains 5 Red and 6 Black balls. One ball is drawn at random from one of the Bags and it is found to be Red. Find the probability that is was drawn from Bag II.

Problem-2

A doctor is to visit a patient. From the experience, it is known that the probabilities that he will come by train, bus, scooter, or by other means of transport are respectively $\frac{3}{10}, \frac{1}{5}, \frac{1}{10}$ and $\frac{2}{5}$.

The probability that he will be late $\frac{1}{4}$, $\frac{1}{3}$ and $\frac{1}{12}$ if he comes by trains, bus, and scooter respectively, but if he comes by other means of transport, then he will not be late. where he arrives, he is late.

What is the probability that he comes by train?

Problem-3

A man is known to speak the truth 3 out of 4 times. He throws a die and reports that it is a six.

Find the probability that it is actually a six.

Problem -4

In a test, an examinee either guesses or copies or knows the answer to a multiple-choice question with four choices. The probability that he makes a guess is $\frac{1}{3}$ and the probability that he copies the answer is $\frac{1}{6}$ the probability that his answer is correct, given that he copied it is $\frac{1}{8}$. Find the probability that he knew the answer to the question, given that correctly answer it.

Problem- 5

A letter is known to have come either from TATANAGAR or CALCUTTA. On the envelope just two consecutive letters TA are visible. What is the probability that the letter has come from

(i) CALCUTTA

(ii) TATANAGAR?

Problem- 6

Suppose that the reliability of HIV test is specified as follows:

Of people having HIV, 90% of the test detects the disease but 10% go undetected.

Of people free of HIV, 99% of the test is to judge HIV negative but 1% is diagnosed as HIV positive.

From a large population of which only 0.1% has HIV, one person is selected randomly, give the HIV test, and the pathologist reports him/her as HIV positive. What is the probability that the person actually has HIV?

HOME ASSIGNMENT

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Q1. A card from a pack of 52 cards are lost. From the remaining cards of the pack, two card are drawn and found to be hearts. Find the probability of missing card is heart.

Q2. Suppose you have two coins which appear identical in your pocket. You know that one is fair and one is 2-headed. If you take one out, toss it and get a head, what is the probability that it was a fair coin?

Q3. Bag I contains 3 red and 4 black balls and bag II contains 4 red and 5 black balls. One ball is transferred from Bag I to Bag II and a ball is drawn from Bag II. The ball so drawn is found to be red on color. Find the probability that transferred ball is black.

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