

Tutorial #6

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Topic: Basics of Probability and Bayes theorem

Questions

- Q.1 Probability that a boy will pass an examination is $\frac{3}{5}$, and that for a girl is $\frac{2}{5}$. What is the probability that at least one of them passes?
- Q.2 A and B toss a coin alternately on the understanding that the first to obtain head wins the toss. Show that their respective chances of winning are $\frac{2}{3}$ and $\frac{1}{3}$.
- Q.3 A and B take turns in throwing two dice, the first to throw 9 being awarded the prize. Show that their chance of winning is in the ratio 9:8
- Q.4 A, B and C, in order toss a coin. The first one to throw a head wins. What are their respective chances of winning assuming that the game may continue indefinitely?
- Q.5 Urn A contains 2 white and 2 black balls. Urn B contains 3 white and 2 black balls. One ball is transferred from A to B and then one ball is drawn out of B. Find the chance that this ball is white. If this ball turns out to be white, find the probability that the transferred ball was white.
- Q.6 Suppose that in answering a question in a multiple choice test, an examinee knows the answer with probability p , or he guesses with probability $1 - p$. Assume that the probability of answering a question correctly is unity for an examinee who knows the answer and $\frac{1}{m}$ for the examinee who guesses, where m is the no. of multiple choice alternatives. Show that the probability that an examinee knows the answer to a problem given that he has correctly answered it, is :

$$\frac{mp}{1 + (m - 1)p}$$