

Your Name:

Duration of the Quiz is 25 minutes. There are three problems, worth 20 points. Show all your work for full credit. Books, notes etc. are prohibited.

1. Consider the following events in the toss of a single die:

A : Observe an odd number.

B : Observe an even number.

C : Observe a 1 or 2.

(a) Are A and B independent events?

(b) Are A and C independent events?

2. A policy requiring all hospital employees to take lie detector tests may reduce losses due to theft, but some employees regard such tests as a violation of their rights. Past experience indicates that lie detectors have accuracy rates that vary from 92% to 99%. To gain some insight into the risks that employees face when taking a lie detector test, suppose that the probability is .05 that a lie detector concludes that a person is lying who, in fact, is telling the truth and suppose that any pair of tests are independent. What is the probability that a machine will conclude that

(a) each of three employees is lying when all are telling the truth?

(b) at least one of the three employees is lying when all are telling the truth?

3. A student answers a multiple-choice examination question that offers four possible answers. Suppose the probability that the student knows the answer to the question is .8 and the probability that the student will guess is .2. Assume that if the student guesses, the probability of selecting the correct answer is .25. If the student correctly answers a question, what is the probability that the student really knew the correct answer?