1. (2.85) The probability that a doctor correctly diagnoses a particular illness is 0.7. Given that the doctor makes an incorrect diagnosis, the probability that the patient files a lawsuit is 0.9. What is the probability that the doctor makes an incorrect diagnosis and the patient sues?

   •

2. (2.89) A town has two fire engines operating independently. The probability that a specific engine is available when needed is 0.96.

   (a) What is the probability that neither is available when needed?

   •

   (b) What is the probability that a fire engine is available when needed?

   •

3. (2.109) A large industrial firm uses three local motels to provide overnight accommodations for its clients. From past experience it is known that 20% of the clients are assigned rooms at the Ramada Inn, 50% at the Sheraton, and 30% at the Lakeview Motor Lodge. If the plumbing is faulty in 5% of the rooms at the Ramada Inn, in 4% of the rooms at the Sheraton, and in 8% of the rooms at the Lakeview Motor Lodge, what is the probability that

   (a) a client will be assigned a room with faulty plumbing?

   •

   (b) a person with a room having faulty plumbing was assigned accommodations at the Lakeview Motor Lodge?

   •

4. (2.113) From a box containing 6 black balls and 4 green balls, 3 balls are drawn in succession, each ball being re- placed in the box before the next draw is made. What is the probability that

   (a) all 3 are the same color?

   -

   (b) each color is represented?

   -

5. (3.1) Classify the following random variables as discrete or continuous:

   X: the number of automobile accidents per year in Virginia.

   -

   Y: the length of time to play 18 holes of golf.

   -

   M: the amount of milk produced yearly by a particular cow.

   -

   N: the number of eggs laid each month by a hen.

   -

   P: the number of building permits issued each month in a certain city.

   -

   Q: the weight of grain produced per acre.

   -

6. (3.3) Let W be a random variable giving the number of heads minus the number of tails in three tosses of a coin. List the elements of the sample space S for the three tosses of the coin and to each sample point assign a value w of W.

7. (3.35) Suppose it is known from large amounts of historical data that X, the number of cars that arrive at a specific intersection during a 20 second time period, is characterized by the following discrete probability function:

$$f(x) = e^{-6}\frac{6^x}{x!}, \forall x \in \mathbb{Z}^+$$

   (a) Find the probability that in a specific 20 second time period, more than 8 cars arrive at the intersection.

   •

   (b) Find the probability that only 2 cars arrive.

   •