2-18

Last year, at Northern Manufacturing Company, 200 people had colds during the year. One hundred fiftyfive people who did no exercising had colds, and the remainder of the people with colds were involved in a weekly exercise program. Half of the 1,000 employees were involved in some type of exercise.

(a) What is the probability that an employee will have a cold next year?

(b) Given that an employee is involved in an exercise program, what is the probability that he or she will get a cold next year?

(c) What is the probability that an employee who is not involved in an exercise program will get a cold next year?

(d) Are exercising and getting a cold independent events? Explain your answer.

2-21

The oasis outpost of Abu Ilan, in the heart of the Negev desert, has a population of 20 Bedouin tribesmen and 20 Farima tribesmen. El Kamin, a nearby oasis, has a population of 32 Bedouins and 8 Farima. A lost Israeli soldier, accidentally separated from his army unit, is wandering through the desert and arrives at the edge of one of the oases. The soldier has no idea which oasis he has found, but the first person he spots at a distance is a Bedouin. What is the probability that he has wandered into Abu Ilan? What is the probability that he is in El Kamin?

2-22

The lost Israeli soldier mentioned in Problem 2-21 decides to rest for a few minutes before entering the desert oasis he has just found. Closing his eyes, he dozes off for 15 minutes, wakes, and walks toward the center of the oasis. The first person he spots this time he again recognizes as a Bedouin. What is the posterior probability that he is in El Kamin?

2-26

The Northside rifle team has two markspersons, Dick and Sally. Dick hits a bull’s-eye 90% of the time, and Sally hits a bull’s-eye 95% of the time.

(a) What is the probability that either Dick or Sally or both will hit the bull’s-eye if each takes one shot?

(b) What is the probability that Dick and Sally will both hit the bull’s-eye?

(c) Did you make any assumptions in answering the preceding questions?If you answered yes, do you think that you are justified in making the assumption(s)?

2-40

Armstrong Faber produces a standard number-two pencil called Ultra-Lite. Since Chuck Armstrong started Armstrong Faber, sales have grown steadily. With the increase in the price of wood products, however, Chuck has been forced to increase the price of the Ultra-Lite pencils. As a result, the demand for Ultra-Lite has been fairly stable over the past 6 years. On average, Armstrong Faber has sold 457,000 pencils each year. Furthermore, 90% of the time sales have been between 454,000 and 460,000 pencils. It is expected that the sales follow a normal distribution with a mean of 457,000 pencils. Estimate the standard deviation of this distribution. (Hint: Work backward from the normal table to find Z. Then apply Equation 2-13.)

2-44

Using the data in Problem 2-43, determine the probability of more than 3 visits for emergency room service on any given day.

2-48

Policy Pollsters is a market research firm specializing in political polls. Records indicate in past elections, when a candidate was elected, Policy Pollsters had accurately predicted this 80% of the time and was wrong 20% of the time. Records also show, for losing candidates, Policy Pollsters accurately predicted they would lose 90% of the time and was wrong only 10% of the time. Before the poll is taken, there is a 50% chance of winning the election. If Policy Pollsters predicts a candidate will win the election, what is the probability that the candidate will actually win? If Policy Pollsters predicts that a candidate will lose the election, what is the probability that the candidate will actually lose?

2-55

Nite Time Inn has a toll-free telephone number so that customers can call at any time to make a reservation. A typical call takes about 4 minutes to complete, and the time required follows an exponential distribution. Find the probability that a call takes

(a) 3 minutes or less.

(b) 4 minutes or less.

(c) 5 minutes or less.

(d) longer than 5 minutes.