MATH30-6 Lecture 9 Examples

1. In a certain region of the country it is known from past experience that the probability of selecting an adult over 40 years of age with cancer is 0.05. If the probability of a doctor correctly diagnosing a person with cancer as having the disease is 0.78 and the probability of incorrectly diagnosing a person without a cancer as having the disease is 0.06, what is the probability that a person is diagnosed as having cancer?
2. Police plan to enforce speed limits by using radar traps at 4 different locations within the city limits. The radar traps at each of the locations L­1, L­2, L­3, and L­4 are operated 40%, 30%, 20%, and 30% of the time, and if a person who is speeding on his way to work has probabilities of 0.2, 0.1, 0.5, and 0.2, respectively, of passing through these locations, what is the probability that he will receive a speeding ticket?
3. Referring to Exercise 1, what is the probability that a person diagnosed as having cancer actually has the disease?
4. If in Exercise 2 the person received a speeding ticket on his way to work, what is the probability that he passed through the radar trap located at L2?
5. A regional telephone company operates three identical relay stations at different locations. During a one-year period, the number of malfunctions reported by each station and the causes are shown below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Stations:** | **A** | **B** | **C** |
| Probability with electricity supplied | 2 | 1 | 1 |
| Computer malfunction | 4 | 3 | 2 |
| Malfunctioning electrical equipment | 5 | 4 | 2 |
| Caused by other human errors | 7 | 7 | 5 |

Suppose that a malfunction was reported and it was found to be caused by other human errors. What is the probability that it came from station C?