We want to find the probability that an ELT was made by Altigauge, given that it is known to be defective. Because we know the condition that the ELT is defective, we can refer to the first column of values, where we see that among the 455 total defective ELTs, 320 were made by Altigauge, so that the probability is $320/455 = 0.703$ (rounded). This is the same result obtained with the formula from Bayes' theorem.

The preceding example involves an extension of Bayes' theorem to three events denoted by *A, B, C*. Based on the format of the formula used in the solution, it is easy to extend Bayes' theorem so that it can be used with four or more events. (See Exercises 11 and 12.)

Exercises

Pregnancy Test Results. ***In Exercises 1 and 2, refer to the results summarized in the table below.***

	Positive Test Result (Pregnancy Is Indicated)	Negative Test Result (Pregnancy Is Not Indicated)
Subject Is Pregnant	80	5
Subject Is Not Pregnant	3	11

1. a. If one of the 99 test subjects is randomly selected, what is the probability of getting a subject who is pregnant?

b. A test subject is randomly selected and is given a pregnancy test. What is the probability of getting a subject who is pregnant, given that the test result is positive?

2. a. One of the 99 test subjects is randomly selected. What is the probability of getting a subject who is not pregnant?

b. A test subject is randomly selected and is given a pregnancy test. What is the probability of getting a subject who is not pregnant, given that the test result is negative?

3. Survey Results In Orange County, 51% of the adults are males. One adult is randomly selected for a survey involving credit card usage. (See Example 2 in this section.)

a. Find the prior probability that the selected person is a female.

b. It is later learned that the selected survey subject was smoking a cigar. Also, 9.5% of males smoke cigars, whereas 1.7% of females smoke cigars (based on data from the Substance Abuse and Mental Health Services Administration). Use this additional information to find the probability that the selected subject is a female.

4. Emergency Locator Transmitters An aircraft emergency locator transmitter (ELT) is a device designed to transmit a signal in the case of a crash. The Altigauge Manufacturing Company makes 80% of the ELTs, the Bryant Company makes 15% of them, and the Chartair Company makes the other 5%. The ELTs made by Altigauge have a 4% rate of defects, the Bryant ELTs have a 6% rate of defects, and the Chartair ELTs have a 9% rate of defects. (These are the same results from Example 3 in this section.)

a. Find the probability of randomly selecting an ELT and getting one manufactured by the Bryant Company.

b. If an ELT is randomly selected and tested, find the probability that it was manufactured by the Bryant Company if the test indicates that the ELT is defective.