



Pre-Employment Drug Screening. In Exercises 13–16, use the test results summarized in Table 4-1, reproduced here. Consider an event to be “unlikely” if its probability is 0.05 or less.

Table 4-1 Pre-Employment Drug Screening Results

	Positive Test Result (Drug Use Is Indicated)	Negative Test Result (Drug Use Is Not Indicated)
Subject Uses Drugs	44 (True Positive)	6 (False Negative)
Subject Is Not a Drug User	90 (False Positive)	860 (True Negative)

13. Pre-Employment Drug Screening If 2 of the 1000 test subjects are randomly selected, find the probability that they both had false positive results. Is it unlikely to randomly select 2 subjects and get 2 results that are both false positive results?

- Assume that the 2 selections are made with replacement.
- Assume that the 2 selections are made without replacement.

14. Pre-Employment Drug Screening If 3 of the 1000 test subjects are randomly selected, find the probability that they all had false negative results. Is it unlikely to randomly select 3 subjects and get 3 results that are all false negative results?

- Assume that the 3 selections are made with replacement.
- Assume that the 3 selections are made without replacement.

15. Pre-Employment Drug Screening If 3 of the 1000 test subjects are randomly selected, find the probability that they all had correct test results (either true positive or true negative). Is such an event unlikely?

- Assume that the 3 selections are made with replacement.
- Assume that the 3 selections are made without replacement.

16. Pre-Employment Drug Screening If 4 of the 1000 test subjects are randomly selected, find the probability that they all had true negative test results. Is such an event unlikely?

- Assume that the 4 selections are made with replacement.
- Assume that the 4 selections are made without replacement.

17. Acceptance Sampling With one method of a procedure called *acceptance sampling*, a sample of items is randomly selected without replacement and the entire batch is accepted if every item in the sample is okay. Among 8834 cases of heart pacemaker malfunctions, 504 were found to be caused by firmware, which is software programmed into the device (based on data from “Pacemaker and ICD Generator Malfunctions,” by Maisel et al., *Journal of the American Medical Association*, Vol. 295, No. 16). If the firmware is tested in three *different* pacemakers randomly selected from this batch of 8834, what is the probability that the firmware in the entire batch will be accepted? Does this procedure suggest that the entire batch consists of good pacemakers? Why or why not?

18. Acceptance Sampling With one method of a procedure called *acceptance sampling*, a sample of items is randomly selected without replacement and the entire batch is accepted if every item in the sample is okay. Among 810 airport baggage scales, 102 are defective (based on data from the New York City Department of Consumer Affairs). If four of the scales are randomly selected and tested, what is the probability that the entire batch will be accepted? Is this scheme likely to detect the large number of defects?