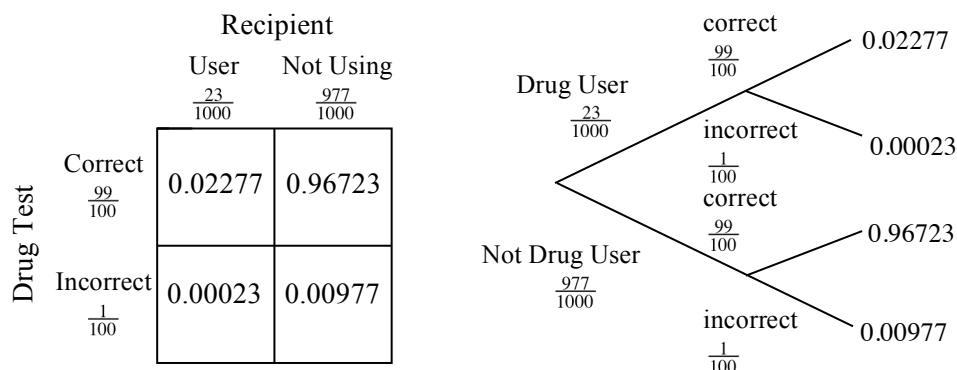

Lesson 4.1.5

- 4-46. a. Answers will vary, but research suggests that people choose the right front tire more often than any other.
- b. Expect $\frac{1}{4}$ or 25% of students to randomly choose the right front tire. The actual number of students who choose right front is typically higher.
- c. The distribution should be skew right with a center around 25% of the number of students in your class.
- d. Students may feel that the class is a representative sample from the population of all students. Without randomization, there is no statistical support for generalizing to the wider population. The information students have simply describes the sample.
- 4-47. Answers vary.
- 4-48. a. There may be a difference in the amount of homework done between grades. For example, 6th graders may spend a small amount of time on homework each night when compared with 8th graders. The 7th graders would probably be somewhere in the middle for the amount of time spent on homework. A stratified sample would ensure that each grade level is represented in your sample and control the large amount of variation that would be due to grade level.
- b. Divide the students into groups based on grade level, 6th, 7th, and 8th. Number the students in each group. Use a random number generator to select 20 numbers and put the corresponding 6th grade students in the sample. Repeat the process for the 7th and 8th grade groups.
- 4-49. a. This information could be found on the web for all American League players. It would be a census, and the answer would be a parameter.
- b. An experiment would need to be conducted on a sample of eggs. The findings would be a statistic.
- c. Random high school students could be surveyed, possibly from different high schools in different parts of the country. Surveying every high school student would be almost impossible, so this survey would be a sample, and the answer would be a statistic.

4-50. a. See possible diagrams and answers below.



- b. 0.02 are actually using; 0.01 are told they are using, but are actually not.
- c. $\frac{0.00977}{0.00977+0.02277} \approx 30\%$
- d. From part (b), about 1 out of 100 people receiving assistance will lose their assistance because they have been falsely accused of using drugs. That seems high considering that only 2 out of 100 are actually using drugs. From part (c), 30% of the people identified as using drugs will be falsely accused and unfairly lose their money.
- e. Yes, they are independent because the accuracy of the test stays the same whether or not a person uses drugs. To test, check whether $P(A) \cdot P(B) = P(A \text{ and } B)$, for example, $P(\text{drug user}) \cdot P(\text{test correct}) = P(\text{drug user and test correct})$.

4-51. Answers may vary but the histogram below is a reasonable representation based on shape and scale.

