

80 CHAPTER 12 PROBABILITY

Spins If the pointer in Fig. 12.17 is spun twice, determine the probability that the pointer lands on green and then red. 42. red on both spins.



Figure 12.17

Spins If the pointer in Fig. 12.18 is spun twice, determine the probability that the pointer lands on red on both spins. a color other than green on both spins.

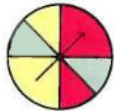


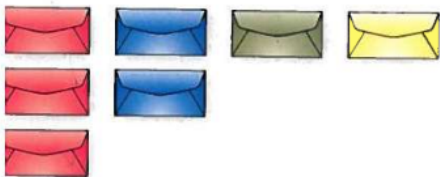
Figure 12.18

In Exercises 45–48, assume that the pointer in 12.16 on page 779 is spun and then the pointer in 12.17 is spun. Determine the probability of the pointers landing on

- red on both spins.
- yellow on the first spin and red on the second spin.
- a color other than red on both spins.

yellow on the first spin and a color other than yellow on the second spin.

In Exercises 49–56, consider the colored envelopes shown below.



If one of the envelopes is selected at random, determine the probability that

- green or a red envelope is selected.

50. an envelope other than a blue envelope is selected.

If two envelopes are selected at random, with replacement, determine the probability that

- 51. both are red envelopes. $\frac{3}{7} \cdot \frac{3}{7} = \frac{9}{49}$
- 52. the first is a blue envelope and the second is a yellow envelope. $\frac{2}{7} \cdot \frac{1}{7} = \frac{2}{49}$

If three envelopes are selected at random, without replacement, determine the probability that

- 53. they are all red envelopes. $\frac{3}{7} \cdot \frac{2}{6} \cdot \frac{1}{5} = \frac{3}{105} = \frac{1}{35}$
- 54. none is a red envelope. $\frac{2}{7} \cdot \frac{1}{6} \cdot \frac{1}{5} = \frac{2}{210} = \frac{1}{105}$
- 55. the first is a red envelope, the second is a blue envelope, and the third is a blue envelope. $\frac{3}{7} \cdot \frac{2}{6} \cdot \frac{1}{5} = \frac{1}{35}$
- 56. the first is a red envelope, the second is a green envelope, and the third is a red envelope. $\frac{3}{7} \cdot \frac{1}{6} \cdot \frac{2}{5} = \frac{1}{35}$

In Exercises 57–60, a couple has three children. Assuming independence and that the probability of a boy is $\frac{1}{2}$, determine the probability that

- 57. all three children are girls. $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$
- 58. all three children are boys. $\frac{1}{8}$
- 59. the youngest child is a boy and the two older children are girls. $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$
- 60. the youngest child is a girl, the middle child is a boy, and the oldest child is a girl. $\frac{1}{8}$

61. a) **Five Children** The Martinos plan to have five children. Determine the probability that all their children will be boys. (Assume that $P(\text{boy}) = \frac{1}{2}$ and assume independence.) $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{32}$

b) If their first four children are boys and Mrs. Martino is expecting another child, what is the probability that the fifth child will be a boy? $\frac{1}{2}$

62. a) **The Probability of a Girl** The Bronsons plan to have eight children. Determine the probability that all their children will be girls. (Assume that $P(\text{girl}) = \frac{1}{2}$ and assume independence.) $\frac{1}{2^8} = \frac{1}{256}$

b) If their first seven children are girls and Mrs. Bronson is expecting another child, what is the probability that the eighth child will be a girl? $\frac{1}{2}$

Golf Balls Angel Sanchez has seven golf balls in one pocket of his golf bag: 4 Titleist balls, 2 Top Flite balls, and 1 Pinnacle ball. In Exercises 63–66, two balls will be selected at random. Determine the probability of selecting each of the following



- a) with replacement.
- b) without replacement.
- 3. a Titleist ball and then a Pinnacle ball
- 4. no Top Flite balls
- 5. at least one Top Flite ball
- 6. two Pinnacle balls

Health Insurance A sample of 50 people yielded the following information about their health insurance.

Number of People	Type of Insurance
24	Managed care plan
19	Traditional insurance
7	No insurance

Two people who provided information for the table were selected at random, without replacement. Determine the probability that

- 7. neither had traditional insurance.
- 8. they both had a managed care plan.
- 9. at least one had traditional insurance.
- 10. the first had traditional insurance and the second had a managed care plan.

Handwritten notes: $\frac{276}{1225}$

Handwritten calculations:

$$\frac{31}{50} \cdot \frac{30}{49} = \frac{93}{245}$$

$$\frac{24}{50} \cdot \frac{23}{49} = \frac{276}{1225}$$

$$1 - \frac{93}{245}$$

$$\frac{19}{50} \cdot \frac{24}{49} = \frac{228}{1225}$$

Landscaping A sample of 40 homeowners who recently hired a landscaping service yielded the following information about their landscaper.

Number of Homeowners	Would You Recommend Your Landscaper to a Friend
23	Yes
7	No
10	Not sure

Three homeowners who provided information for the table were selected at random. Determine the probability that

- 71. they would all recommend their landscaper.
- 72. the first would not recommend the landscaper, but the second and third would recommend their landscapers.
- 73. the first two would not recommend their landscapers, and the third is not sure if he or she would recommend the landscaper.
- 74. the first would recommend his or her landscaper, but the second and third would not recommend their landscaper.

A New Medicine In Exercises 75–78, a new medicine was given to a sample of 100 hospital patients. Of the total, 70 patients reacted favorably, 10 reacted unfavorably, and 20 were unaffected by the drug. Assume that this sample is representative of the entire population. If this medicine is given to Mr. and Mrs. Rivera and their son Carlos, what is the probability of each of the following? (Assume independence.)

- 75. Mrs. Rivera reacts favorably.
- 76. Mr. and Mrs. Rivera react favorably, and Carlos is unaffected.
- 77. All three react favorably.
- 78. No one reacts favorably.

Multiple-Choice Exam In Exercises 79–84, each question of a five-question multiple-choice exam has four possible answers. Gurshawn Salk picks an answer at random for each question. Determine the probability that he selects the correct answer on

- 79. any one question.
- 80. only the first question.
- 81. only the third and fourth questions.