

## 4.2 Section Exercises

### Complement

*Describe the complement for the given event.*

1. Out of 253 apple trees in the orchard, just 42 are ready for harvesting.
2. In the graduating class at one large high school, 39% of the graduates plan to attend college out-of-state.
3. Out of 21 players on the baseball team, 4 are left-handed.
4. The adult literacy rate for the United States is 97%.
5. A local news station claims that 70% of its viewers are over the age of 30.
6. Of the students not returning to Valley State Community College for the next semester, 75% of them either graduated or transferred to a university or both.

### Complement Rule

*Use the Complement Rule to find each probability.*

7. A food distributor estimates that 2% of the eggs it delivers to grocery stores are cracked. What is the probability that an egg selected at random will not be cracked?
8. Every eleventh box of Blue Zinga cereal that is produced contains a special toy. If you buy a box of Blue Zinga, what is the probability that your box does not contain a toy?
9. Find the probability of rolling two dice and not getting doubles.
10. Given that every fifth person in line will get a coupon for a free box of popcorn at the movies, what is the probability that you don't get a coupon when you're in line?

### Mutually Exclusive Events

*Determine whether the events are mutually exclusive.*

11. For a survey on campus, a sophomore or a history major is chosen.
12. When determining his schedule for the spring semester, Troy must decide whether to take a history class that meets at 9:00 a.m. on Mondays, Wednesdays, and Fridays or a science class that meets Mondays and Wednesdays at 9:30 a.m. (Assume that each class meets for 50 minutes.)
13. When assigning parts in a high school play, a senior or someone who's been in at least two other plays can play the lead role.
14. Choose a diet cola or a bottle of water out of the refrigerator.
15. Invest all disposable income in a startup tech company or real estate.
16. A student scores an A on an exam, or a student scores a passing grade.

### Probability

*Calculate each probability.*

17. Suppose that 4 out of the 15 doctors in a small hospital are trained in special procedures. 11 out of the 15 are under the age of 45, and 2 are both trained in special procedures and under the age of 45. What is the probability that you are randomly assigned a doctor trained in special procedures or a doctor under the age of 45?
18. Nineteen college graduates are applying for internships at a Wall Street financial institution. Of these applicants, 12 graduated from Ivy League universities, 8 are business majors, 9 graduated summa cum laude, and 5 graduated summa cum laude from Ivy League universities. If one resume is selected at random for the first interview, what is the probability that the applicant is either an Ivy League graduate or a summa cum laude graduate?

19. The local arbor society is giving out free trees to the public. They have 200 pine trees, 100 dogwoods, 125 oaks, and 200 birch trees. If you are the first in line to receive your free tree and you cannot choose what type of tree you are given, what is the probability that you randomly get either an oak or a dogwood?
20. A flight attendant for USA Airlines is given an assignment that is randomly chosen from the following available flights: 15 European destinations, 6 Caribbean destinations, 8 South American destinations, 5 Asian destinations, and 11 destinations in the continental United States. What is the probability that his next assignment takes him either to Europe or Asia?
21. Consider the experiment in which two six-sided dice are tossed. What is the probability that the total is not four?
22. Consider the experiment in which two six-sided dice are tossed. What is the probability that either both dice are sixes or neither die is a six?
23. What's the probability of rolling at most one even number with two six-sided dice?
24. Jacki has a sizable collection of music downloaded to her phone. The relative frequencies for each genre of music she has stored are given in the table below.

Jacki's Music Collection	
Genre	Relative Frequency
Rock	0.3256
Country	0.1181
R&B	0.2068
Oldies	0.0843
Show Tunes	0.1956
Bluegrass	0.0696

If Jacki chooses the shuffle option and one song is randomly chosen for play, what is the probability that it is either country or bluegrass?

25. Ana is looking forward to starting kindergarten in her Texas hometown. Of 14 kindergarten teachers, 3 are new this year, 11 are bilingual, and 1 is both new and bilingual. If class rosters are generated at random, what is the probability that Ana's teacher is either new or bilingual?
26. What is the probability of rolling two six-sided dice and obtaining either an odd total or a total less than six?
27. In the teacher's pencil box, 13 out of the 20 pencils have no eraser, and 12 out of the 20 are not mechanical pencils. There are 4 pencils that are both mechanical and have erasers on them. What is the probability that Ava chooses a pencil at random from the box and gets either a mechanical pencil or a pencil with an eraser?
28. For a story she is writing in her high school newspaper, Grace surveys moviegoers selected at random as they leave the new feature *Mystery on Juniper Island*. She simply asks each moviegoer to rate the show using a thumbs-up or thumbs-down. The results of her survey are given in the table below.

Survey Results		
	Under 40 years old	40 years or older
Thumbs-Up	23	40
Thumbs-Down	19	11

What is the probability that one of Grace's survey respondents has either given a thumbs-up rating or is under 40 years old?