UNIT 7

APPLICATIONS OF PROBABILITY

1. In a certain town, the probability that a person plays sports is 65%. The probability that a person is between the ages of 12 and 18 is 40%. The probability that a person plays sports and is between the ages of 12 and 18 is 25%. Are the events independent? How do you know?

2. Terry has a number cube with sides labeled 1 through 6. He rolls the number cube twice.

a) What is the probability that the sum of the two rolls is a prime number, given that at least one of the rolls is a 3?

b) What is the probability that the sum of the two rolls is a prime number or at least one of the rolls is a 3?

3. Mrs. Klein surveyed 240 men and 285 women about their vehicles. Of those surveyed, 155 men and 70 women said they own a red vehicle. If a person is chosen at random from those surveyed, what is the probability of choosing a woman or a person that does NOT own a red vehicle?

4. Bianca spins two spinners that have four equal sections numbered 1 through 4. If she spins a 4 on at least one spin, what is the probability that the sum of her two spins is an odd number?

5. Each letter of the alphabet is written on a card using a red ink pen and placed in a container. Each letter of the alphabet is also written on a card using a black ink pen and placed in the same container. A single card is drawn at random from the container.

What is the probability that the card has a letter written in black ink, the letter A, or the letter Z?

6. In Mr. Mabry's class, there are 12 boys and 16 girls. On Monday, 4 boys and 5 girls were wearing white shirts.

a) If a student is chosen at random from Mr. Mabry's class, what is the probability of choosing a boy or a student wearing a white shirt?

b) If a student is chosen at random from Mr. Mabry's class, what is the probability of choosing a girl or a student not wearing a white shirt?

7. Assume that the following events are independent:
The probability that a high school senior will go to college is 0.72.
The probability that a high school senior will go to college and live on campus is 0.46.

What is the probability that a high school senior will live on campus, given that the person will go to college?

8. Abdu, Reilly, Chandra, and Delroy are on a Student Council committee. For the January meeting, they put their names in a hat and draw one name at random to decide who will take notes. They do the same thing for the February meeting. What is the probability that Abdu will be chosen at least once or Reilly will be chosen at least once?

9. Meadow Ridge High School has 820 students. There are 88 students in vocal music, 142 students in instrumental music, and 190 students in vocal or instrumental music. Which option shows the approximate probability that a randomly chosen student at Meadow Ridge High School is in both vocal and instrumental music?

a. 4.9% b. 6.6% c. 16.6% d. 29.8%

10. A school librarian surveyed 300 students. He listed three novels and three movies, and asked the students to choose one from each category as their favorite. The table below shows the survey results.

Favorite novel	Favorite movie			Total
	Nine Dogs	***Henry Porter***	***Summerwater***	
The Hidden Gnome	25	70	25	120
Mosquito Nights	22	22	31	75
Tomato	33	28	44	105
Total	80	120	100	300

Consider the following events, which apply to a randomly chosen student in the survey sample.

HG: The student chose *The Hidden Gnome* as his or her favorite novel.

S: The student chose *Summerwater* as his or her favorite movie.

Which statement is true about events *HG* and *S*?

a. Events *HG* and *S* are dependent and $P(HG|S) < P(S|HG)$.

b. Events *HG* and *S* are dependent and $P(HG|S) > P(S|HG)$.

c. Events *HG* and *S* are independent and $P(HG|S) < P(S|HG)$.

d. Events *HG* and *S* are independent and $P(HG|S) > P(S|HG)$.

11. Jamil is a political science major. As part of an assignment, he collected data about how the citizens in three towns voted in an election for a county sheriff. The table below shows the data.

Town	Candidate		Total
	Blake	Valdez	
Greenville	645	890	1,535
Clinton	520	1,610	2,130
Springdale	950	1,242	2,192
Total	2,115	3,742	5,857

The following probabilities apply to a randomly chosen voter in the sample. Which probability is the greatest?

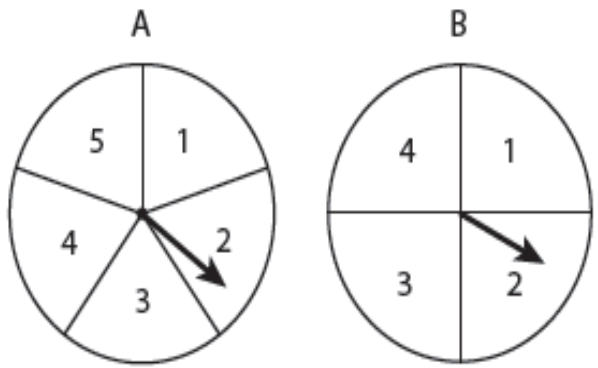
a. the probability that the voter lives in Springdale

b. the probability that the voter voted for Blake

c. the probability that the voter lives in Springdale, given that she or he voted for Blake

d. the probability that the voter voted for Blake, given that she or he lives in Springdale

12. Remy spins spinner A and then spins spinner B. What is the probability that his first spin is odd if the product of his spins is even?



a. 0

b. $\frac{3}{7}$

c. $\frac{1}{2}$

d. $\frac{3}{5}$

13. The table below shows some data about a restaurant's pizza sales.

Crust	Pizza size		
	Small	Medium	Large
Thin	20	15	25
Thick	20	25	15

Consider the following events.

THIN: A thin-crust pizza is sold.

S: A small pizza is sold.

Which statement is true about events *THIN* and *S*?

a. Events *THIN* and *S* are dependent and $P(THIN|S) < P(S|THIN)$.

b. Events *THIN* and *S* are dependent and $P(THIN|S) > P(S|THIN)$.

c. Events *THIN* and *S* are independent and $P(THIN|S) < P(S|THIN)$.

d. Events *THIN* and *S* are independent and $P(THIN|S) > P(S|THIN)$.