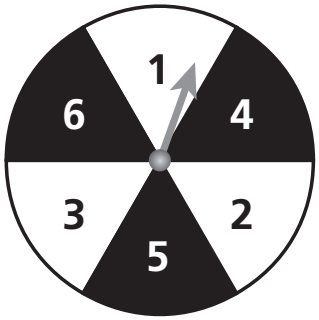
12.4 Start Thinking

Use the spinner shown to complete the exercises.



1. What is the sample space if the spinner is spun one time?
2. What is the probability of the spinner stopping on 3?
3. What is the probability of the spinner stopping on a white space?
4. What is the probability of the spinner stopping on a black space or an even number?
5. What is the probability of the spinner stopping on 6 or a white space?

12.4 Warm Up

There are three different colors of gumballs in a package, but not the same number of each color. Use the given probabilities of randomly selecting red and blue to find the missing probability if you know there are 24 gumballs in the package.

1. $P(\text{red}) = \frac{5}{24}$, $P(\text{blue}) = \frac{1}{3}$, $P(\text{green}) =$
2. $P(\text{red}) = \frac{1}{6}$, $P(\text{blue}) = \frac{1}{2}$, $P(\text{green or blue}) =$

12.4 Cumulative Review Warm Up

Write a rule for the *n*th term of the sequence.

1. 0, 3, 6, 9, 12, ...
2. $\frac{1}{4}, \frac{2}{6}, \frac{3}{8}, \frac{4}{10}, \frac{5}{12}, \ldots$
3. $-2, 4, -8, 16, -32, \ldots$

Name_____ Date _____

12.4 Practice A

In Exercises 1 and 2, events *A* and *B* are disjoint. Find *P*(*A* or *B*).

1. $P(A) = 0.4,\ P(B) = 0.2$

2. $P(A) = \frac{1}{3},\ P(B) = \frac{1}{2}$

3. At the high school swim meet, you and your friend are competing in the 50 Freestyle event. You estimate that there is a 40% chance you will win and a 35% chance your friend will win. What is the probability that you or your friend will win the 50 Freestyle event?

In Exercises 4 and 5, you roll a die. Find *P*(*A* or *B*).

4. **Event *A*:** Roll a 2.
Event *B*: Roll an odd number.

5. **Event *A*:** Roll an even number.
Event *B*: Roll a number greater than 3.

6. You bring your cat to the veterinarian for her yearly check-up. The veterinarian tells you that there is a 75% probability that your cat has a kidney disorder or is diabetic, with a 40% chance it has a kidney disorder and a 50% chance it is diabetic. What is the probability that your cat has both a kidney disorder and is diabetic?

7. A game show has three doors. A Grand Prize is behind one of the doors, a Nice Prize is behind one of the doors, and a Dummy Prize is behind one of the doors. You have been watching the show for a while and the table gives your estimates of the probabilities for the given scenarios.

	Door 1	Door 2	Door 3
Grand Prize	0.25	0.45	0.3
Nice Prize	0.4	0.25	0.35
Dummy Prize	0.35	0.3	0.35

a. Find the probability that you win either the Grand Prize or a Nice Prize if you choose Door 1.

b. Find the probability that you win either the Grand Prize or a Nice Prize if you choose Door 2.

c. Find the probability that you win either the Grand Prize or a Nice Prize if you choose Door 3.

d. Which door should you choose? Explain.

Name _____ Date _____

12.4 Practice B

In Exercises 1 and 2, events *A* and *B* are disjoint. Find *P*(*A* or *B*).

1. $P(A) = 0.375,\ P(B) = 0.2$

2. $P(A) = \frac{1}{4},\ P(B) = \frac{1}{5}$

3. You are performing an experiment to determine how well pineapple plants grow in different soils. Out of the 40 pineapple plants, 16 are planted in sandy soil, 18 are planted in potting soil, and 7 are planted in a mixture of sandy soil and potting soil. What is the probability that a pineapple plant in the experiment is planted in sandy soil or potting soil?

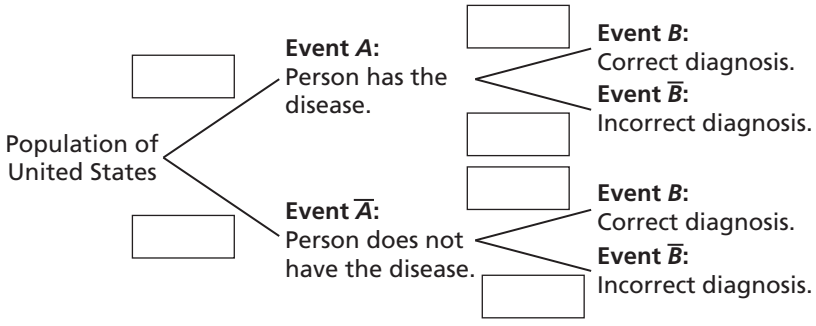
In Exercises 4 and 5, you roll a die. Find *P*(*A* or *B*).

4. **Event *A*:** Roll a prime number.
   Event *B*: Roll a number greater than 2.

5. **Event *A*:** Roll an even number.
   Event *B*: Roll an odd number.

6. An Educational Advisor estimates that there is a 90% probability that a freshman college student will take either a mathematics class or an English class, with an 80% probability that the student will take a mathematics class and a 75% probability that the student will take an English class. What is the probability that a freshman college student will take both a mathematics class and an English class?

7. A test diagnoses a disease correctly 92% of the time when a person has the disease and 80% of the time when the person does not have the disease. Approximately 4% of people in the United States have the disease. Fill in the probabilities along the branches of the probability tree diagram and then determine the probability that a randomly selected person is correctly diagnosed by the test.



Name_____ Date _____

12.4 Enrichment and Extension

Probability of Disjoint and Overlapping Events

Use the formula for overlapping events to complete the exercises.

1. A certain drug causes a skin rash or hair loss in 35% of patients. Twenty-five percent of patients experience only a skin rash, and 5% experience both a skin rash and hair loss. A doctor wants to know the probability that a patient will experience hair loss only.

   a. Using A to represent "experiences a skin rash" and B to represent "experiences hair loss," write a symbolic representation of the problem.

   b. Using the symbolic representation from part (a), find the probability that a patient will experience hair loss only.

2. You and your friend recorded a compact disc together. The CD contained solos and duets. Your friend recorded twice as many duets as solos, and you recorded six more solos than duets. When a CD player selects one of these songs at random, the probability that it will select a duet is 25%. Let s represent the number of solos that your friend recorded.

   a. Write a rational equation to express the probability of randomly selecting a duet in terms of s.

   b. Solve the equation. Then determine the total number of songs recorded.

   c. Find the probability of selecting one of your solos or a duet when a CD player selects one song at random.

3. Police report that 78% of drivers stopped on suspicion of driving under the influence are given a breath test, 36% a blood test, and 22% both tests. What is the probability that a randomly selected driver suspected of driving under the influence is given a blood test or a breath test, but not both?

4. A bag contains 36 marbles, some of which are red and the rest are black. The black and red marbles are either clear or opaque. When a marble is randomly selected from the bag, the probability that it is red is $\frac{1}{4}$, that it is opaque is $\frac{7}{9}$, and that it is red or opaque is $\frac{11}{12}$.

   a. How many marbles are black?

   b. How many marbles are black and opaque?

Name _____ Date _____

12.4 Puzzle Time

What Are A Plumber's Favorite Shoes?

Write the letter of each answer in the box containing the exercise number.

Find the probability.

1. In a group of 25 students at lunch, 10 prefer ketchup on their hamburger, 10 prefer mustard on their hamburger, and 5 like both ketchup and mustard on their hamburger. The rest of the students in the group prefer neither. What is the probability that a student selected from this group will prefer ketchup or mustard on their hamburger?
2. A card is randomly selected from a standard deck of 52 cards. What is the probability that it is a 2 or an 8?
3. In a class of 50 high school juniors, 32 students either play a sport or are in the marching band. There are 22 juniors who play a sport and 16 who are in the marching band. What is the probability that a randomly selected junior plays a sport and is in the marching band?
4. You roll a die. What is the probability that you roll an even number or a 5?
5. You roll a die. What is the probability that you roll an odd number or a factor of 6?

Answers

O. $\frac{3}{25}$

L. $\frac{2}{13}$

G. $\frac{2}{3}$

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

S. $\frac{5}{6}$

1	2	3	4	5