PRACTICE & PROBLEM SOLVING

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Practice Tutorial

Additional Exercises Available Online

UNDERSTAND

9. Construct Arguments Let S be a sample space for an experiment in which every outcome is both equally likely and mutually exclusive. What can you conclude about the sum of the probabilities for all of the outcomes? Give an example.

10. Error Analysis At Lincoln High School, 6 students are members of both the Chess Club and the Math Club. There are 20 students in the Math Club, 12 students in the Chess Club, and 400 students in the entire school.

Danielle calculated the probability that a student chosen at random belongs to the Chess Club or the Math Club. Explain her error.

Event C: Student is in Chess Club
Event M: Student is in Math Club

$$P(C \text{ or } M) = P(C) + P(M)$$
$$= \frac{12}{400} + \frac{20}{400}$$
$$= \frac{32}{400} = 0.08$$

✗

11. Higher Order Thinking Murphy's math teacher sometimes wears scarves to class. Murphy has been documenting the relationship between his teacher wearing a scarf and when the class has a math quiz. The probabilities are as follows:

- P(wearing a scarf) = 10%
- P(math quiz) = 15%
- P(wearing a scarf and math quiz) = 5%

Are the events "the teacher is wearing a scarf" and "there will be a quiz" independent events? Explain.

Reason A card is drawn from a box containing 5 cards, each showing a different number from 1 to 5. Consider the events "even number," "odd number," "less than 3," and "greater than 3." Determine whether each pair of events mutually exclusive.

12. $< 3, > 3$

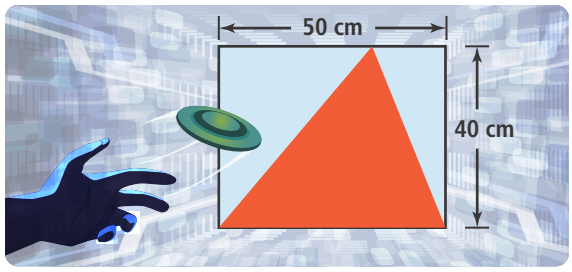
13. even, > 3

14. odd, > 3

15. odd, even

PRACTICE

16. Hana is playing a virtual reality game in which she must toss a disc to land on the largest triangular section of the board. If the disc is equally likely to land anywhere on the board, what is the probability that she will succeed? Explain. SEE EXAMPLE 1



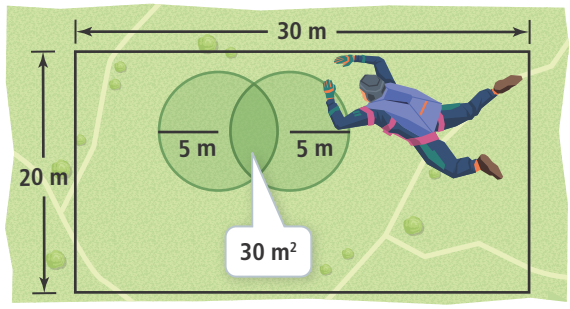
In a class of 25 students, 8 students have heights less than 65 inches and 10 students have heights of 69 inches or more. For Exercises 17–19, find the probabilities described. SEE EXAMPLE 1

17. P(less than 65 inches or greater than 69 inches)

18. P(greater than or equal to 65 inches)

19. P(greater than or equal to 65 inches and less than or equal to 69 inches)

20. A skydiver is equally likely to land at any point on a rectangular field. Two overlapping circular targets of radius 5 meters are marked on the field. To the nearest percent, what is the probability that the sky diver will land in one or both of the circles? SEE EXAMPLE 2



21. Two marbles are chosen at random, one at a time from a box that contains 7 marbles, 5 red and 2 green. SEE EXAMPLES 3 AND 4

a. Find the probability of drawing 2 red marbles when the first marble is replaced before the second marble is chosen.

b. Determine whether the situation described is independent.

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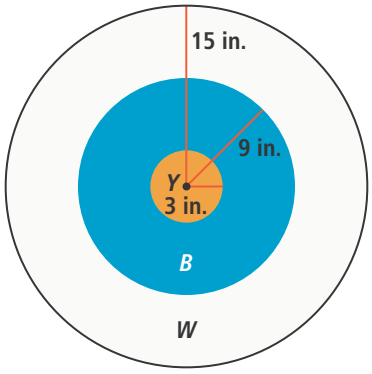
APPLY

22. **Mathematical Connections** For a science fair project, Paige wants to test whether ants prefer certain colors. She releases ants on the colored surface shown. If the ants are randomly distributed across the entire surface, what is the probability that any given ant will be within the blue circle, but not within the yellow circle? Round to the nearest whole percent.



23. **Use Structure** A city issues 3-digit license plates for motorized scooters. The digits 0–9 are chosen at random by a computer program. What is the probability that a license plate issued meets each set of criteria?

a. no digit is repeated

b. all 3 digits are the same

c. the 3-digit number formed is even

d. the first two digits are the same and the third digit is different

24. **Model With Mathematics** During a football game, a kicker is called in twice to kick a field goal from the 30 yard line. Suppose that for each attempt, the probability that he will make the field goal is 0.8.

a. What is the probability that he will make both field goals?

b. What is the probability that he will make neither field goal?

ASSESSMENT PRACTICE

25. The probability of events A and B both occurring is 15%. The probability of event A or B occurring is 60%. The probability of B occurring is 50%. What is the probability of A occurring?

26. **SAT/ACT** A robot spins the spinner shown twice. Assume that the outcomes 1, 2, 3, and 4 are equally likely for each spin. What is the probability that the sum of the two outcomes will be 6?

Ⓐ $\frac{1}{16}$

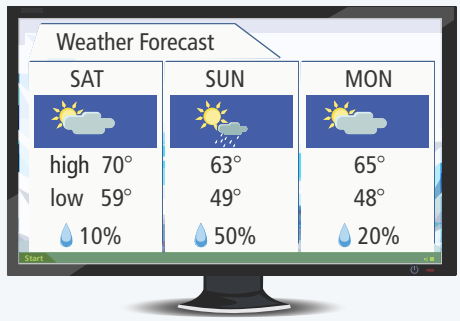
Ⓑ $\frac{1}{8}$

Ⓒ $\frac{3}{16}$

Ⓓ $\frac{1}{4}$

Ⓔ $\frac{3}{4}$

27. **Performance Task** Paula is packing to visit a friend in another city for a long weekend. She looks at the weather forecast shown below to find the chance of rain. Assume that whether it rains on each day is independent of whether it rains on any other day.



Part A What is the probability that it will not rain on any of the three days to the nearest percent?

Part B What is the probability that it will rain at least one of the three days to the nearest percent?

Part C Do you think Paula should pack an umbrella? Explain.