

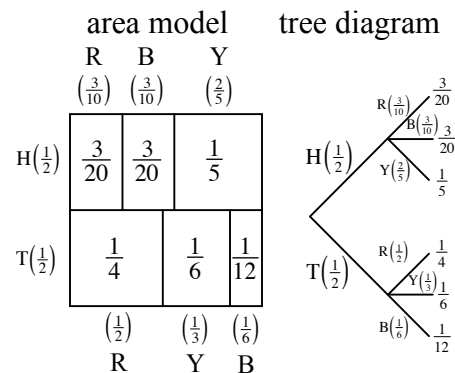
## GEOMETRIC PROBABILITY

#8

The **PROBABILITY** of an event involving outcomes with different probabilities is represented using an area model and a tree diagram. For one example and a complete explanation of the two methods see the Math Notes box on page 212 of the textbook. Two additional examples are shown below.

### Example 1

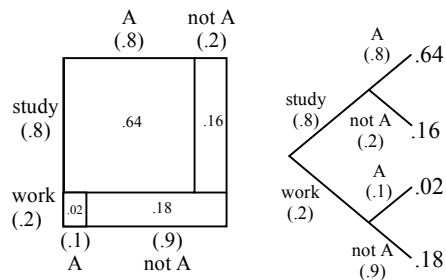
A popular game at a county fair is Flip-to-Spin-or-Roll. You start by flipping a coin. If heads comes up, you get to spin the big wheel, which has ten equal sectors: three red, three blue, and four yellow. If the coin shows tails, you roll a cube with three sides red, two yellow sides, and one blue side. If your spin lands on blue or the blue side of the cube comes up you win a prize. What is the probability of winning a prize?



Using the two blue boxes from the area model or the two blue branches from the tree diagram, the probability of winning a prize is  $\frac{3}{20} + \frac{1}{12} = \frac{14}{60} = \frac{7}{30}$ .

### Example 2

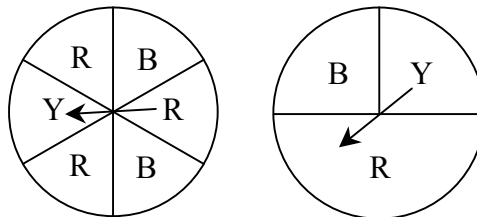
There are five children in Sarah's family. Each night one child has to help at the family business. A spinner is used to determine who has to work each night. Sarah has a big math test tomorrow and knows there is an 80% chance of getting an "A" if she can study but only a 10% chance of getting an "A" if she can not study. What is the probability of Sarah getting an "A"?



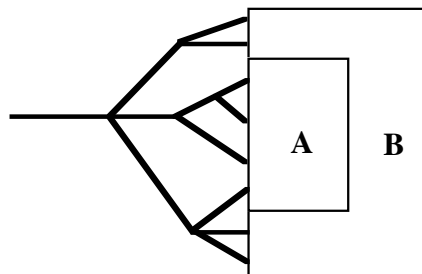
Using the two "A" boxes from the area model or the two "A" branches from the tree diagram, the probability of getting an A is  $0.64 + 0.02 = 0.66$ .

For each question use an area model or a tree diagram to compute the desired probability.

For problems 1-3 use the spinners at right

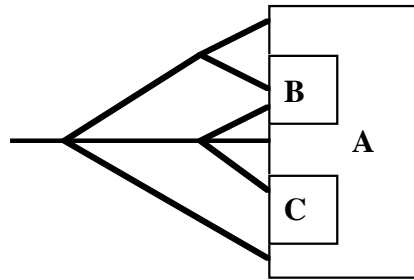


1. If each spinner is spun once, what is the probability that both spinners show blue?
2. If each spinner is spun once, what is the probability that both spinners show the same color?
3. If each spinner is spun once, what is the probability of getting a red-blue combination?
4. A pencil box has three yellow pencils, one blue, and two red pencils. There are also two red erasers and one blue. If you randomly choose one pencil and one eraser, what is the probability of getting the red-red combination?
5. Sally's mother has two bags of candy but she says that Sally can only have one piece. Bag #1 has 70% orange candies and 30% red ones. Bag #2 has 10% orange, 50% white, and 40% green. Sally's eyes are covered and she chooses one bag and pulls out one candy. What is the probability that she choose her favorite color-orange?
6. You throw a die and flip a coin. What is the probability of getting tails on the coin and a number less than five on the die?
7. A spinner is evenly divided into eight sections—three are red, three are white and two are blue. If the spinner is spun twice, what is the probability of getting the same color twice?
8. Your friend and you have just won a chance to collect a million dollars. You place the money in one room at right and you friend has to walk through the maze. In which room should you place the money so that your friend will have the best chance of finding the million dollars?



9. Find the probability of randomly entering each room.

- a) P(A)
- b) P(B)
- c) P(C)



10. The weather forecast is a 60% chance of rain. If there is no rain then there is an 80% chance of going to the beach. What is the probability of going to the beach?
11. A baseball player gets a hit 40% of the time if the weather is good but only 20% of the time if it is cold or windy. The weather forecast is a 70% chance of nice, 20% chance of cold, and 10% chance of windy. What is the probability of getting a hit?
12. If you have your assignment completed before the next day there is an 80% chance of a good grade. If the assignment is finished during class or late then there is only a 30% chance of a good grade. If assignments are not done at all then there is only a 5% chance of a good grade. In a certain class, 50% of the students have the assignment completed before class, 40% finish during class, and 10% do not do their assignments. If a student is selected at random, what is the probability that student has a good grade?

**Answers**

- |  |                                 |                    |                         |
|--|---------------------------------|--------------------|-------------------------|
| 1. $\frac{1}{12}$                              | 2. $\frac{9}{24} = \frac{3}{8}$ | 3. $\frac{7}{24}$  | 4. $\frac{2}{9}$        |
| 5. $\frac{2}{5}$                               | 6. $\frac{1}{3}$                | 7. $\frac{11}{32}$ | 8. $P(B) = \frac{5}{9}$ |
| 9. $\frac{11}{18}, \frac{5}{18}, \frac{2}{18}$ | 10. 0.32                        | 11. 0.34           | 12. 0.525               |