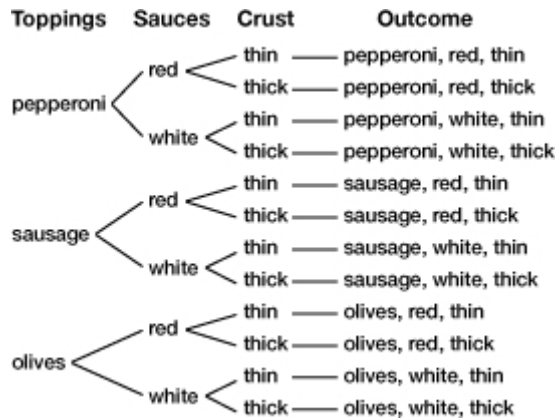


## Lesson 12-1

### Example 1 Use a Tree Diagram

**PIZZA** Classic Pizza bakes their pizzas in red or white sauce on a thin or thick crust. They offer pepperoni, sausage, or olives as their toppings. Draw a tree diagram to determine the number of different pizzas they offer with one topping.



There are 12 different pizzas.

### Example 2 Real-World Example

**LICENSE PLATES** The state of Ohio has license plates that use 6 characters. The characters are ordered with two letters of the alphabet, then two numbers between 0 and 9, then two more letters of the alphabet. How many different license plates are possible?

Use the Fundamental Counting Principle.

number of possible letters for the first place	×	number of possible letters for the second place	×	number of possible numbers for the third place	×	number of possible numbers for the fourth place	×	number of possible letters for the fifth place	×	number of possible letters for the sixth place	=	
26	×	26	×	10	×	10	×	26	×	26	=	45,697,600

There are 45,697,600 possible license plates.

### Example 3 Real-World Example

**GAMES** What is the probability of winning a lottery game where the winning number is made up of four digits from 0 to 9 chosen at random?

First, find the number of possible outcomes. Use the Fundamental Counting Principle.

$$\begin{array}{ccccccc} \text{choices} & & \text{choices for} & & \text{choices} & & \text{choices for} & & \text{total} \\ \text{for the} & \times & \text{the second} & \times & \text{for the} & \times & \text{the fourth} & = & \text{number of} \\ \text{first digit} & & \text{digit} & & \text{third digit} & & \text{digit} & & \text{outcomes} \\ 10 & \times & 10 & \times & 10 & \times & 10 & = & 10,000 \end{array}$$

There are 10,000 possible outcomes. There is 1 winning number. So, the probability of winning with one ticket is  $\frac{1}{10,000}$ . This can also be written as a decimal, 0.0001, or as a percent, 0.01%.