# 12.4 Solve Problems Using Organized Lists

▶ **GOAL: Use an organized list to solve a problem.**

1. Kito has four coins in his pocket. He says they are a combination of quarters, dimes, and nickels.

   a) Complete the table below to find all the possible combinations of coins.

| Quarters | Dimes | Nickel | Total |
|---|---|---|---|
| 4 | 0 | 0 | $1.00 |
| 3 | 1 | 0 | |
| 3 | 0 | 1 | |
| 2 | | | |
| 2 | | | |
| 2 | | | |
| 1 | | | |
| 1 | | | |
| 1 | | | |
| 1 | | | |
| 0 | | | |
| 0 | | | |
| 0 | | | |
| 0 | | | |
| 0 | | | |

**At-Home Help**

When using an organized list, look for patterns in your chart or table. This will help you to be sure that you did not miss or repeat any combinations.

   b) What pattern do you see in the organized list? _____

   _____

   c) Kito says the coins add up to $0.40. If you are given only one guess, what is the probability that you will guess the correct combination of coins?

2. Carina has three marbles in a bag: a white one, a red one, and a green one. She takes the marbles out one at a time and records the order of the colours. What is the probability that Carina will take the marbles out in this order: red, green, white?

# 12.5 Using Simulations to Determine Probability

▶ **GOAL: Choose a model to determine the probability of a real-life event.**

1. When a coin is tossed, the theoretical probability of getting heads is $\frac{1}{2}$, or 0.5. Rowyn wanted to find out if the experimental probability was the same as the theoretical probability. She tossed a coin 50 times and recorded her results: 23 heads and 27 tails.

   a) What is the experimental probability of tossing heads?

   b) What is the experimental probability of tossing tails?

2. a) Jordan's parents are planning to have two more children. What is the theoretical probability that both children will be girls?

   b) Which model would you choose to calculate the experimental probability that both children will be girls? Explain your answer.
   - rolling a die
   - tossing a coin
   - spinning a spinner divided into four parts

   _____

   _____

   c) Use your model to carry out a simulation. Then calculate the experimental probability.

   d) How does your experimental probability compare to the theoretical probability you calculated in part (a)?

   _____

**At-Home Help**

A **simulation** is an experiment that models an actual event. When solving probability problems, it can help to use a model to simulate the event. Some examples of models include flipping a coin, spinning a spinner, choosing cards, or rolling dice. To calculate the experimental probability, use this expression:

$$\frac{\text{number of trials in which the desired event was observed}}{\text{total number of trials in the experiment}}$$