PROBLEM 1 Pizza Special

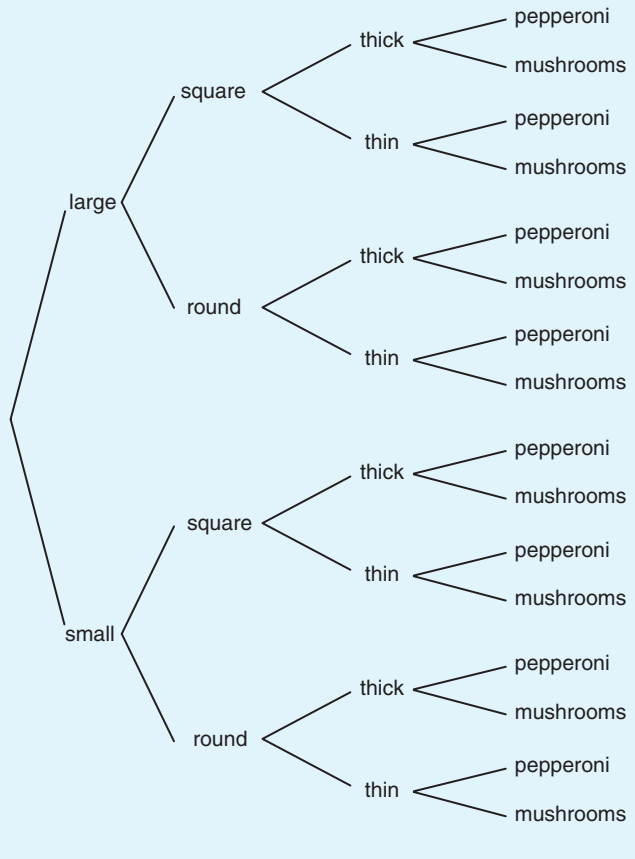
Mario's Pizzeria advertises special deals in the newspaper.

> **Today's Special at Mario's Pizzeria**
>
> Large one-topping pizza $9.00
>
> Small one-topping pizza $6.50
>
> Choose either a square or a round pizza with thick or thin crust.
>
> **Available toppings: pepperoni or mushrooms**
>
> **Enjoy a fresh-baked pizza!!!**

A **tree diagram** is a visual model for determining the sample space of multiple events.

Amaliya and Romeo sketched tree diagrams to show the possible pizza specials at Mario's Pizzeria.

Amaliya



PROBLEM 4 Stan's Frozen Yogurt

Stan's Frozen Yogurt Shop offers frundaes—frozen yogurt sundaes. The shop advertises different frundae options for customers.

BUILD YOUR OWN FRUNDAE

Choose one yogurt flavor, fruit, and topping.

Frozen Yogurt Flavors	*Fruit*	*Toppings*
vanilla	bananas	nuts
chocolate	cherries	sprinkles
strawberry		granola
peach		

A) Make a tree diagram of the different sundae options consisting of one yogurt flavor, one fruit, and one topping.

B) How many different sundaes can be made?

PROBLEM 6 The Counting Principle

To determine the total number of possible lunches in Problem 3, Paula used a mathematical principle called the *Counting Principle*. The principle is used to determine the number of outcomes in the sample space.

The **Counting Principle** states that if an action A can occur in m ways and for each of these m ways an action B can occur in n ways, then actions A and B can occur in $m \cdot n$ ways.

The Counting Principle can be generalized to more than two actions that happen in succession. If for each of the m and n ways A and B occur there is also an action C that can occur in s ways, then Actions A, B, and C can occur in $m \cdot n \cdot s$ ways.

1. Devin has an all-day pass for Scream amusement park. His favorite rides are the Bungee-Buggy, Head Rush roller coaster, Beep Beep go-karts, and Tsunami Slide water roller coaster. He never rides any other rides, and he can ride each of his favorite rides as many times as he wants.

A) How many ride order possibilities are there for Devin's next five rides?

2. Sherry stayed home from school Wednesday because she was ill. She watched a television program from 12:00 p.m. until 12:30 p.m., and another program from 12:30 p.m. until 1:00 p.m. From 12:00 p.m. until 12:30 p.m., her program choices were the news, cartoons, or a talk show. From 12:30 p.m. until 1:00 p.m., her program choices were a comedy, a soap opera, a game show, or a cooking show.

A) How many program selections can Sherry watch from 12:00 pm until 1:00 pm?

3. A student's daily schedule includes math, English, science, social studies, foreign language, art, and physical education. Students are enrolled in each class for one period per day.

A) Determine how many different orders the classes can be arranged to fill a seven-period daily schedule.

c. Lunch period is directly after fourth period. How many different class schedule arrangements are possible before lunch period? Explain your reasoning.

4. The cell phone PIN to access voicemail is a 4-digit number. Each digit can be a number from 0 to 9, including 0 and 9. How many 4-digit numbers are possible? Repetition of numbers is allowed. Explain your calculation.

5. If repeating digits is not permitted, how many different 4-digit PINs are possible?

6. A typical license plate number for a car consists of three letters followed by four numbers ranging from 0 through 9, including 0 and 9. How many different license plates numbers are possible if letters and numbers can be repeated? Explain your calculation.

7. How many different 3-letter, 4-digit license plate numbers are possible if letters and digits cannot be repeated?