

## Practice Product Principle

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Suppose Sofia has 4 sandwiches, 5 condiments, and 3 side dishes. How many meals can she make?

2. If there are 6 girls who are waiting to use a two person lift, how many ways can the first lift be seated?

3. Mathew is creating a passcode that must consist of one single digit number followed by 2 letters. How many possible passwords are there?

4. Hailey wants to visit 4 stores at the mall. How many ways can she do this?

5. Riley needs to choose two distinct colored pencils for a craft. She has 5 pencil options, How many pairs can she choose?

Answers:

**1. 60**

Sofia has 4 sandwich options, 5 condiment options, and 3 side options. We are going to follow the product principle, which means we must multiply the number of options in each category.

$$5 \times 4 \times 3 = 60$$

**2. 30**

Let's call the first girl A, second girl B, and so on. For the first seat, you have 6 options to choose from. For the second seat, you have 5 options, since one girl is already seated. Therefore, the answer is  $6 \times 5 = 30$ .

**3. 6760**

There are 10 possible digits and 26 letters.  
 $26 \times 26 \times 10 = 6760$  possible passwords.

**4. 24**

There are  $4!$  ways she can visit the stores.  
 $4! = 4 \times 3 \times 2 \times 1$ . Like the previous questions, Hailey at first has 4 options, then 3, then 2, then 1.

**5. 21**

Since Riley cannot choose the same two pencil colors and order matters (choosing pencil 1 then 2 is equal to choosing pencil 2 then 1).

We cannot just multiply  $7 \times 6$ . Instead we should use  ${}^7C_2 = \frac{(7!)}{(2!(7-2)!)} = 21$ .