The annual fall festival is tomorrow. Everyone needs to fill out a meal order form for the cookout.

Does everyone have a form?

Ms. Q.?

Yes, Grogg?

This doesn’t seem like a lot of choices.

There are only 2 choices of meat, 3 sides, 3 drinks, and 2 desserts to choose from.

Name

Fall Festival Cookout Order Form

Circle 1 item from each category:

Meat

Hot Dog

Hamburger

Add Ketchup

Add Mustard

Sides

Potato Salad

Green Beans

Corn

Drink

Milk

Juice

Lemonade

Dessert

Brownie

Pie

You can choose one of each.

How many different meals can you make with those choices?

Let’s see...

I could have a hot dog, green beans, juice, and pie...

...or a hot dog, corn, milk, and a brownie...

...or a hamburger, potato sala--

Grogg!

You’ll never count all of the possible meals that way!

How could you count all of the meals?
Let’s start with the meat and the sides.

You can have a hot dog with any of the three sides...

...or a hamburger with any of the three sides.

That makes 6 ways to choose a meat and a side.

We can make a diagram!

For each of the 6 ways that you can choose a meat and a side, you can choose milk, juice, or lemonade.

Then, you can choose a drink!

That makes 18 ways to choose a meat, a side, and a drink...

That starting with a hot dog, potato salad and milk--

And ending with a hamburger, corn, and lemonade.

We’ve made 18 different meals...

...and we haven’t even gotten to dessert!

For each of the 18 meals already on our diagram, there are 2 choices for dessert.
This is called a tree diagram. It is used for counting possibilities, like the number of meals you can make with the given choices.

I’ll write “brownie” and “pie” next to each of the 18 meals we have so far.

That makes $18 \times 2 = 36$ possible meals.

Wait! We didn’t need to draw the whole diagram to count the number of meals.

We could have just multiplied!

Since there are 2 choices of meat and 3 choices of side, there are $2 \times 3 = 6$ options for meat and a side.

Times 3 choices of drink makes $2 \times 3 \times 3 = 18$ options for meat, side, and drink!

Times 2 choices for dessert makes $2 \times 3 \times 3 \times 2 = 36$ options for the entire meal!

I see what she means!

2 \times 3 \times 3 \times 2 = 36
With 2 choices of meat, 3 sides, 3 drinks, and 2 desserts, there are $2 \times 3 \times 3 \times 2 = 36$ possible meals.

But, I forgot to add a third choice of dessert! You can also choose to have a cookie.

How many meals are possible now?

Now, we have our choice of 2 meats, 3 sides, 3 drinks, and 3 desserts.

That makes $2 \times 3 \times 3 \times 3 = 54$ possible meals!

$2 \times 3 \times 3 \times 3 = 54$

54 options!

What’s the matter, Grogg?

Now I’ll never be able to decide.