

Order of operations

Google Sheets calculates formulas based on the following **order of operations**:

1. Operations enclosed in **parentheses**
2. **Exponential** calculations (3^2 , for example)
3. **Multiplication** and **division**, whichever comes first
4. **Addition** and **subtraction**, whichever comes first

A mnemonic that can help you remember the order is **Please Excuse My Dear Aunt Sally**.

Click the arrows in the slideshow below to learn how the order of operations is used to calculate formulas in Google Sheets.

Using the Order of Operations

P
E
M
D
A
S

$$10 + (6 - 3) / 2^2 * 4 - 1$$

• While this formula may look complicated, we can use the order of operations step by step to find the right answer.

Using the Order of Operations

Parentheses **10 + (6-3)/2^2*4-1**

E

M

D

A

S

Using the Order of Operations

P **10 + (6-3)/2^2*4-1**

Exponents

10 + 3/2^2*4-1

M

D

A

S

Using the Order of Operations

P $10 + (6 - 3) / 2^2 * 4 - 1$
E $10 + 3 / 2^2 * 4 - 1$
Multiplication $10 + 3 / 4 * 4 - 1$
Division Whichever comes first!
A
S

Using the Order of Operations

P $10 + (6 - 3) / 2^2 * 4 - 1$
E $10 + 3 / 2^2 * 4 - 1$
Multiplication $10 + 3 / 4 * 4 - 1$
Division Whichever comes first! $10 + 0.75 * 4 - 1$
A
S

Using the Order of Operations

P		$10 + (6 - 3) / 2^2 * 4 - 1$
E		$10 + 3 / 2^2 * 4 - 1$
M		$10 + 3 / 4 * 4 - 1$
D		$10 + 0.75 * 4 - 1$
Addition	Whichever comes first!	$10 + 3 - 1$
Subtraction		

Using the Order of Operations

P		$10 + (6 - 3) / 2^2 * 4 - 1$
E		$10 + 3 / 2^2 * 4 - 1$
M		$10 + 3 / 4 * 4 - 1$
D		$10 + 0.75 * 4 - 1$
Addition	Whichever comes first!	$10 + 3 - 1$
Subtraction		$13 - 1$

Using the Order of Operations

P $10 + (6 - 3) / 2^2 * 4 - 1$
E $10 + 3 / 2^2 * 4 - 1$
M $10 + 3 / 4 * 4 - 1$
D $10 + 0.75 * 4 - 1$
A $10 + 3 - 1$
S $13 - 1 = 12$

Creating complex formulas

In the example below, we'll demonstrate how Google Sheets solves a complex formula using the order of operations. The complex formula in cell **D6** calculates the sales tax by adding the prices together and multiplying by the 5.5% tax rate (which is written as 0.055).

	A	B	C	D
1		Catering Invoice Sabrosa Empanadas & More 1202 Biscayne Bay Drive Orlando, FL 32804		Invoice #: 5690B
2	MENU ITEM	UNIT PRICE	QUANTITY	LINE TOTAL
3	Tamales: Carnitas	\$2.29	20	\$45.80
4	Tamales: Vegetable	\$2.29	30	\$68.70
5	Empanadas: Nutella & Banana	\$3.99	40	\$159.60
6			TAX	$= (D3 + D4 + D5) * 0.055$
7			TOTAL	
8				

Google Sheets follows the order of operations and first adds the values inside the parentheses: **(D3+D4+D5) = \$274.10**. Then it multiplies by the tax rate: **\$274.10*0.055**. The result will show that the tax is **\$15.08**.

	A	B	C	D
1		Catering Invoice Sabrosa Empanadas & More 1202 Biscayne Bay Drive Orlando, FL 32804		Invoice #: 5690B
2	MENU ITEM	UNIT PRICE	QUANTITY	LINE TOTAL
3	Tamales: Carnitas	\$2.29	20	\$45.80
4	Tamales: Vegetable	\$2.29	30	\$68.70
5	Empanadas: Nutella & Banana	\$3.99	40	\$159.60
6			TAX	\$15.08
7			TOTAL	
8				

It's especially important to follow the order of operations when creating a formula. Otherwise, Google Sheets won't calculate the results accurately. In our example, if the **parentheses** are not included, the multiplication is calculated first and the result is incorrect. Parentheses are often the best way to define which calculations will be performed first in Google Sheets.

QUANTITY	LINE TOTAL
20	\$45.80
30	\$68.70
40	\$159.60
TAX	=D3+D4+D5*0.055
TOTAL	

TAX	\$123.28
TOTAL	

To create a complex formula using the order of operations:

In the example below, we'll use **cell references** along with **numerical values** to create a complex formula that will calculate the **subtotal** for a catering invoice. The formula will calculate the cost of each menu item first, then add these values.

1. Select the **cell** that will contain the formula. In our example, we'll select cell C5.

<i>fx</i>			
	A	B	C
2	MENU ITEM	UNIT PRICE	QUANTITY
3	Empanadas: Poblano & Cheese	\$2.79	35
4	Empanadas: Spicy Sweet Potato	\$2.29	20
5		SUBTOTAL	
6		TOTAL w/ TAX	
7			

2. Enter your **formula**. In our example, we'll type `=B3*C3+B4*C4`. This formula will follow the order of operations, first performing the multiplication: $2.79 \times 35 = 97.65$ and $2.29 \times 20 = 45.80$. It then will add these values to calculate the total: $97.65 + 45.80$.

<i>fx</i>	<code>=B3*C3+B4*C4</code>		
	A	B	C
2	MENU ITEM	UNIT PRICE	QUANTITY
3	Empanadas: Poblano & Cheese	\$2.79	35
4	Empanadas: Spicy Sweet Potato	\$2.29	20
5		SUBTOTAL	<code>=B3*C3+B4*C4</code>
6		TOTAL w/ TAX	
7			

3. Double-check your formula for accuracy, then press **Enter** on your keyboard. The formula will calculate and display the **result**. In our example, the result shows that the subtotal for the order is **\$143.45**.

<i>fx</i>	<code>=B3*C3+B4*C4</code>		
	A	B	C
2	MENU ITEM	UNIT PRICE	QUANTITY
3	Empanadas: Poblano & Cheese	\$2.79	35
4	Empanadas: Spicy Sweet Potato	\$2.29	20
5		SUBTOTAL	\$143.45
6		TOTAL w/ TAX	
7			

Google Sheets **will not always tell you** if your formula contains an error, so it's up to you to check all of your formulas. To learn how to do this, read our article on why you should **Double-Check Your Formulas!**