

Create complex formulas

When a formula contains multiple operations, the order of those operations tells Google Sheets which operation should be calculated first.

You may have experience working with formulas that contain only one operator, such as $7 + 9$. More complex formulas may contain several mathematical operators, such as $5 + 2 * 8$. When there are multiple operations in a formula, the order of operations tells Google Sheets which operation to calculate first. To write formulas that give you the correct answer, you need to understand the order of operations.


Order of operations

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


1. The operations are placed in parentheses.
2. Exponential calculations (e.g., 3^2)
3. Multiplication and division, whichever comes first.
4. Addition and subtraction, whichever comes first.

Create 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 sales tax by adding the prices together and multiplying by the tax rate of 5.5% (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, multiply by the tax rate: $\$274.10 * 0.055$. The result will show the tax as \$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 formulas. Otherwise, Google Sheets won't calculate the result correctly. In the example, if the parentheses aren't included, the multiplication will be calculated first, and the result will be incorrect. Parentheses are often the best way to specify which calculation should 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 | |

How to create a complex formula using the order of operations

The example below will use cell references along with numerical values to create a complex formula to calculate a subtotal for a food and beverage bill. The formula will calculate the cost of each item on the menu first, then add these values.

1. Select the cell that will contain the formula. For example, we would select cell C5.

| | 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. For example, you would enter **=B3*C3+B4*C4**. This formula will follow the order of operations, first performing the multiplication: **2.79*35 = 97.65** and **2.29*20 = 45.80**. Then, it will add these values to calculate the sum: **97.65+45.80**.

| | 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 | =B3*C3+B4*C4 |
| 6 | | TOTAL w/ TAX | |
| 7 | | | |

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

| | 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 | | | |

Note: Google Sheets doesn't always tell you if a formula is wrong, so you need to check all your formulas yourself.

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