Lesson 3-1: Understand precedence rules and use the Evaluate feature

Here are Excel's precedence rules:

Operator	Description
Parenthesis (brackets)	Any expression in brackets is always evaluated first. **(6+2)*3=24**
Exponent	Exponents are always evaluated next. Exponents tend to be used in engineering/scientific scenarios and are rarely seen in accounting scenarios. **(1+1)*6^2=72**
Multiply and Divide	Multiplication and Division operators have the same precedence and are evaluated from left to right.
Add and Subtract	Addition and Subtraction operators have the same precedence and are evaluated from left to right.

If you only ever work with accounting scenarios, all you really need to remember is:

- Brackets are evaluated first.

- Multiplication and Division are evaluated next.

- Addition and Subtraction are evaluated last.

1   Open *Payroll-1* from your sample files folder.

This worksheet contains some simple formulas required to compute *Net Pay* from *Hours Worked* (see *Payroll Rules* grab on facing page).

Most tax regimes have more complicated rules than those defined in this simple example. Employees are paid the same hourly rate for all hours worked. A different percentage of gross pay is then deducted for Tax, Social Security and Pension contributions.

2   Evaluate the formula in cell B17.

Cell B17 contains the simple formula:

f_x	=B15*B4
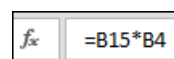
There's really not much that can go wrong with such a simple formula, but let's see how it works using Excel's evaluation feature.

1.   Click on cell B17.

2.   Click: Formulas→Formula Auditing→Evaluate Formula.

Payroll-1

	A	B
1	Payroll	
2		
3	Payroll Rules	
4	Hourly rate	12.00
5	Tax	32%
6	Social Security	8%
7	Pension	5%
8		
9	Day	Hours Worked
10	Monday	10
11	Tuesday	8
12	Wednesday	12
13	Thursday	7
14	Friday	9
15	Total	46
16		
17	Gross	552.00
18	Tax	176.64
19	Social Security	44.16
20	Pension	27.60
21	Net Pay	303.60
22		
23	Net Pay	303.60

The *Evaluate Formula* dialog appears. You can see that the first part of the formula that will be evaluated is **B15**. This is indicated by an underline:
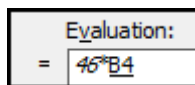
Evaluation:
= B15*B4
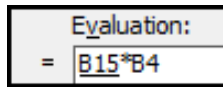
3. Click the *Step In* button. This will show the formula behind cell B15.

Reference:
Sheet1!$B$17 = B15*B4
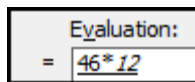 Sheet1!$B$15 = SUM(B10:B14)
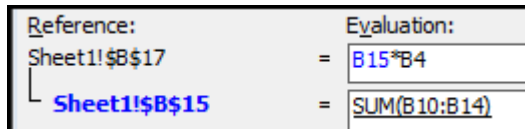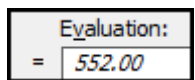
4. Click the *Step Out* button.

The value in cell B15 now replaces the cell reference:

Evaluation:
= 46*B4

5. Click the *Evaluate* button. The value in cell B4 now replaces the cell reference:

Evaluation:
= 46*12

6. Click the *Evaluate* button again. You can now see the result of the evaluation:

Evaluation:
= 552.00

The *Evaluate* button has now changed its caption to *Restart*. If you wanted to, you could click this button to start the evaluation process all over again.

7. Click the *Close* button.

3 Evaluate the formula in cell B23.

To better illustrate the Evaluate feature, a formula that uses a rather long winded way of calculating *Net Pay* has been inserted into cell B23:

f_x =B15*B4-B15*B4*B5-B4*B15*B6-B4*B15*B7
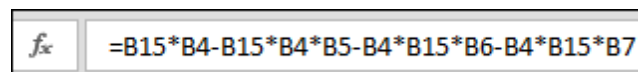
Because of the rules of precedence, the formula works correctly. It could also have been written with parentheses like this:

f_x =(B15*B4)-(B15*B4*B5)-(B4*B15*B6)-(B4*B15*B7)
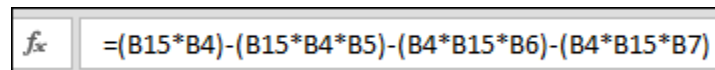
The parentheses are not needed because the precedence rules state that multiplication happens before subtraction. I still prefer the formula with redundant parentheses (see sidebar).

4 Save your work as *Payroll-2*.

tip

Use parentheses to make formulas more readable

I often use parenthesis even when they are not needed.

There are two reasons for this:

1. The formula is easier to read.

2. Errors caused by precedence–related mistakes are eliminated.