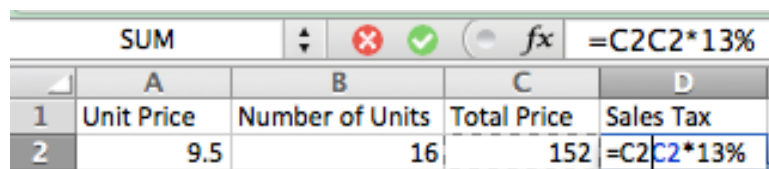


In Figure 10 the user has pressed F2 a second time and then pressed the Left Arrow key once. Instead of the text cursor moving 1 character to the left, cell C2 is selected in the spreadsheet and C2 is displayed a second time in the formula bar. If the user would press the Left Arrow key again, cell B2 would be selected and B2 would be displayed instead of C2. This can be confusing in the beginning but it does make sense.



SUM				
	A	B	C	D
1	Unit Price	Number of Units	Total Price	Sales Tax
2	9.5	16	152	=C2C2*13%

Figure 10

Copying Formulas

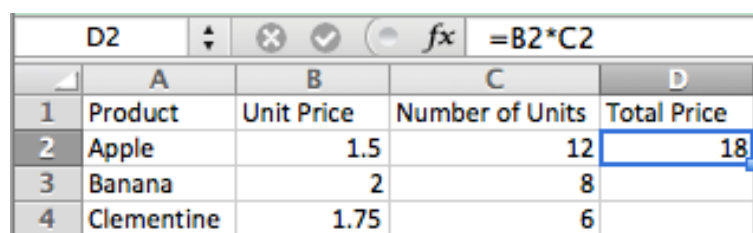
It is possible to copy and paste formulas in Excel. This saves time and efforts however it is necessary to understand how the references to cells work in a formula.

There are 2 types of cell references in formulas; relative and absolute.

Relative Reference

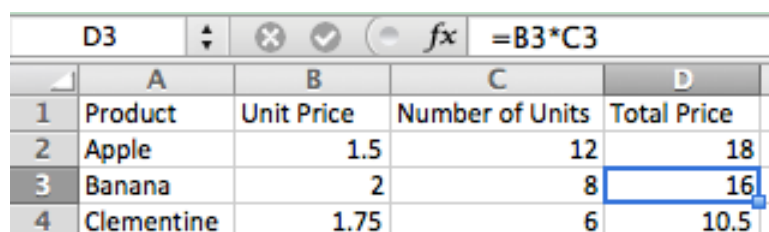
Consider a formula written in cell D2 that refers to cells B2 and C2. When copying the formula in D2 to D3 the formula changes to B3 and C3. This happens because the formula is relative the cell the formula is in. The formula in D2 could be read in the following way: 2 cells to my left (B2) multiplied by 1 cell to my left (C2). So when the formula is copied to cell D3 it still says 2 cells to my left multiple by 1 cell to my left, in other words B3 and C3.

Figure 11 and Figure 12 shows copying and pasting a formula in action.



D2				
	A	B	C	D
1	Product	Unit Price	Number of Units	Total Price
2	Apple	1.5	12	18
3	Banana	2	8	
4	Clementine	1.75	6	

Figure 11



D3				
	A	B	C	D
1	Product	Unit Price	Number of Units	Total Price
2	Apple	1.5	12	18
3	Banana	2	8	16
4	Clementine	1.75	6	10.5

Figure 12

Absolute Reference

When copying formulas you sometimes want to be able refer to a cell address in an absolute manner, i.e. you always mean e.g. cell B1 no matter where you copy the formula to.

Consider the formula in cell E3 in Figure 13. We want to be able to copy the formula to cells E4 and E5.

E3					
	A	B	C	D	E
1	Tax rate	13%			
2	Product	Unit Price	Number of Units	Total Price	Sales Tax
3	Apple	1.5	12	18	2.34
4	Banana	2	8	16	
5	Clementine	1.75	6	10.5	

Figure 13

In Figure 14 we can see what happens if we copy as described above. E4 has an error due to trying to multiply the number 16 with the words "Unit Price". Less obvious is the mistake in cell E5, here 10.5 was multiplied with 1.5, or 150%, which a pretty high sales tax.

E4					
	A	B	C	D	E
1	Tax rate	13%			
2	Product	Unit Price	Number of Units	Total Price	Sales Tax
3	Apple	1.5	12	18	2.34
4	Banana	2	8	16	#VALUE!
5	Clementine	1.75	6	10.5	15.75

Figure 14

In order to be able to copy the formula in cell E3 above we need to refer to cell B1 absolutely such that when we copy the formula it will always refer B1, the way to do that is to write \$B\$1.

Figure 15 shows the correct formula.

E3					
	A	B	C	D	E
1	Tax rate	13%			
2	Product	Unit Price	Number of Units	Total Price	Sales Tax
3	Apple	1.5	12	18	2.34
4	Banana	2	8	16	
5	Clementine	1.75	6	10.5	

Figure 15

In Figure 16 the copying now behaves as expected.

E4					
fx =D4*\$B\$1					
	A	B	C	D	E
1	Tax rate	13%			
2	Product	Unit Price	Number of Units	Total Price	Sales Tax
3	Apple	1.5	12	18	2.34
4	Banana	2	8	16	2.08
5	Clementine	1.75	6	10.5	1.365

Figure 16

Mixed Reference

It is possible to have mixed references. These are needed when the user only wants to make only the column or the row absolute.

In Figure 17 you can see how all four (absolute, relative and 2 mixed) types of references behave.

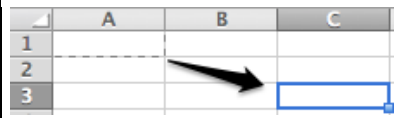
For a formula being copied:	If the reference is:	It changes to:
	\$A\$1 (absolute column and absolute row)	\$A\$1 (the reference is absolute). Nothing changes.
	A1 (relative column and relative row)	C3 (the reference is relative). Both column and row changes.
	A\$1 (relative column and absolute row)	C\$1 (the reference is mixed). Only the column changes.
	\$A1 (absolute column and relative row)	\$A3 (the reference is mixed). Only the row changes.

Figure 17

By pressing F4 while editing or entering a formula a cell reference changes between the 4 reference types.

Example 1

To illustrate both types of mixed reference the example below shows how to create a times table by using 1 formula only.

Figure 18 shows an example of a formula that uses the 2 types of mixed reference.