

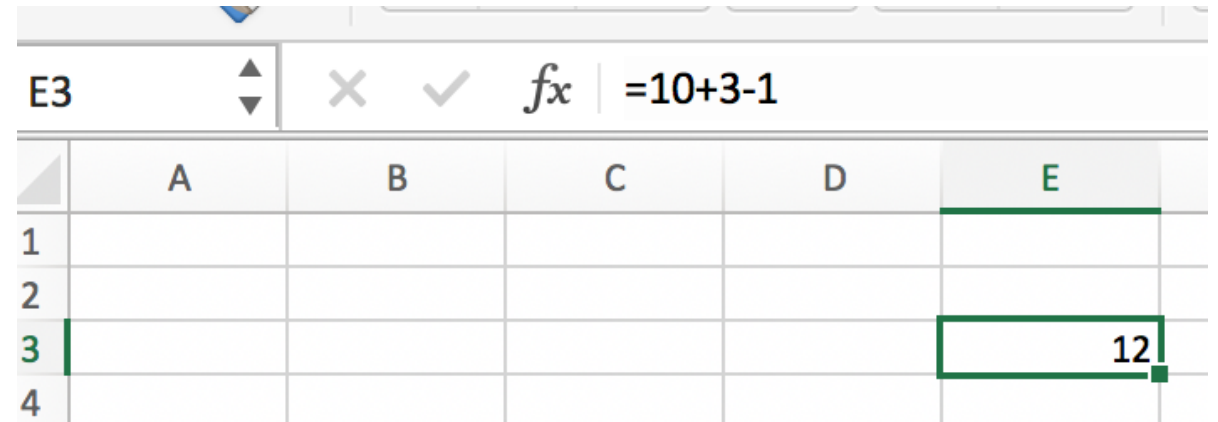
# An Introduction to Microsoft Excel

# Microsoft Excel

- Microsoft Excel is a spreadsheet software capable of analyzing and visualizing data.
- Excel is extremely useful tool that can save you an enormous amount of time by performing calculations at scale.
- Here is a rough rule of thumb:
  - If anything in Excel (apart from typing a formula) takes longer than a second, there's probably a faster method.
- Understanding tabular data and Excel formulae will help when we start programming in python.

# Excel Formulae

- An Excel formula is an equation that will automatically perform calculations for you.
- A formula can be initiated by beginning your entry with the equal sign.

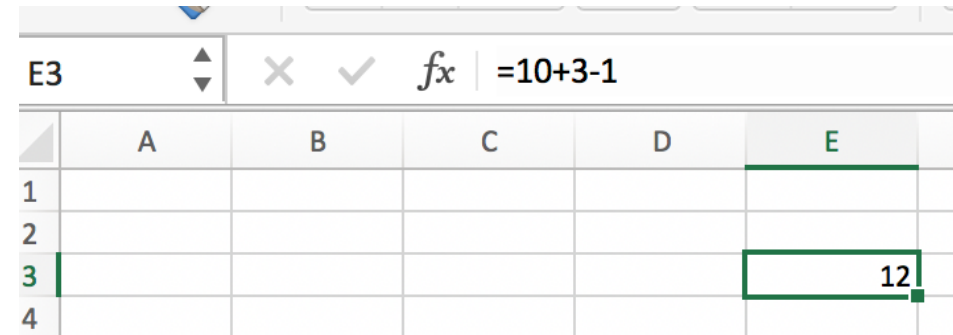


The image shows a screenshot of an Excel spreadsheet. The formula bar at the top displays the formula  $=10+3-1$ . The spreadsheet grid shows columns A through E and rows 1 through 4. Cell E3 is highlighted with a green border and contains the value 12, which is the result of the formula entered in the formula bar.

	A	B	C	D	E
1					
2					
3					12
4					

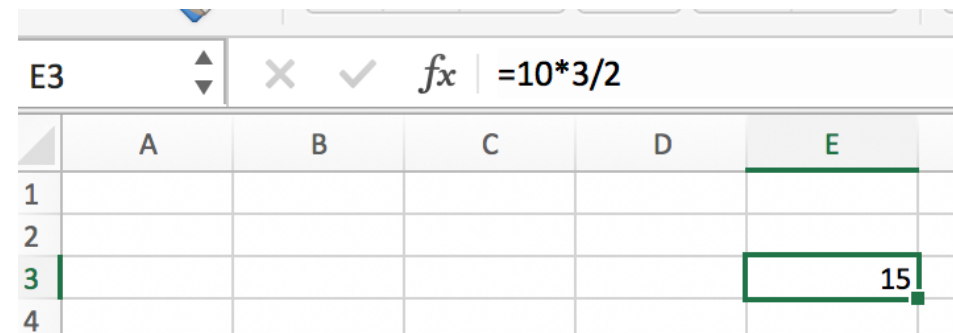
# Mathematics in Excel

- +, addition
- -, subtraction
- \*, multiplication
- /, division
- ^, exponentiation
- There are also useful, built-in functions like SUM(), AVERAGE(), etc.



The screenshot shows the Excel interface with the formula bar displaying `=10+3-1`. The spreadsheet grid has columns A through E and rows 1 through 4. Cell E3 is selected and contains the value 12.

	A	B	C	D	E
1					
2					
3					12
4					



The screenshot shows the Excel interface with the formula bar displaying `=10*3/2`. The spreadsheet grid has columns A through E and rows 1 through 4. Cell E3 is selected and contains the value 15.

	A	B	C	D	E
1					
2					
3					15
4					

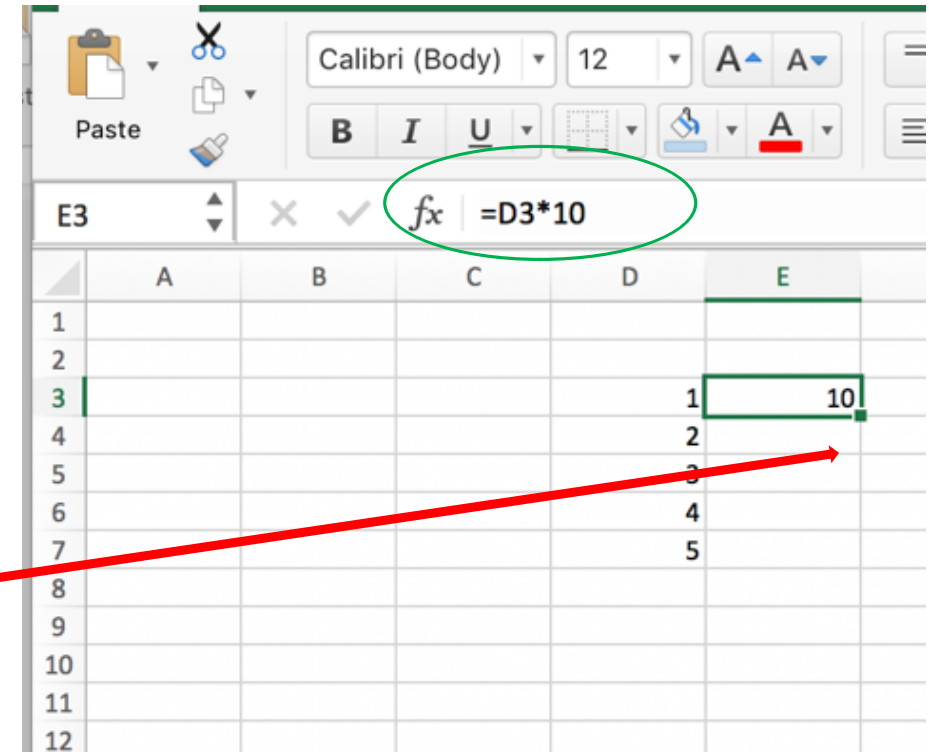
# Cell References

- A formula can reference another cell by name, and will automatically update when the cells referenced are changed.

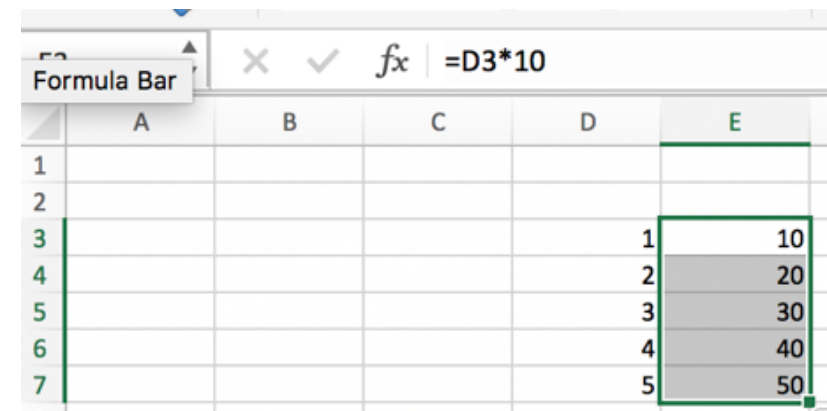
PI					
	A	B	C	D	E
1					
2					
3				9	= (D3+1)/D4
4				5	
5					

# The “Fill Handle”

- Once a formula is entered at the top of a column, the formula can be ‘copied’ down the column by double clicking the fill handle.



- If there is a reference to a cell, that reference will also move down its column.



# Freezing Cell References

- If, on the other hand, you do NOT want a cell reference to change, you can 'freeze' the cell reference in the formula with the dollar sign symbol.
  - Place a \$ in front of the column name to prevent the column from changing.
  - Place a \$ in front of the row number to prevent the row from changing.

The screenshot shows the Excel formula bar with the formula `=D3*10+$C$2`. The `D3` is highlighted in blue, and the `$C$2` is highlighted in red and circled in green. Below the formula bar, a grid shows the data for rows 1-7 and columns A-E. Cell B2 contains the text 'constant'. Cell C2 contains the value 5. Cell D3 contains the value 1. Cell E3 contains the formula `=D3*10+$C$2`. The grid is partially obscured by red and blue selection boxes.

	A	B	C	D	E
1					
2		constant	5		
3				1	=D3*10+\$C\$2
4				2	
5				3	
6				4	
7				5	

The screenshot shows the Excel grid with the formula `=D7*10+$C$2` entered in cell E7. The grid shows the data for rows 1-7 and columns A-E. Cell B2 contains the text 'constant'. Cell C2 contains the value 5. Cell D3 contains the value 1, D4 contains 2, D5 contains 3, D6 contains 4, and D7 contains 5. Cell E3 contains the value 15, E4 contains 25, E5 contains 35, E6 contains 45, and E7 contains 55. The cell E7 is highlighted with a green border.

	A	B	C	D	E
1					
2		constant	5		
3				1	15
4				2	25
5				3	35
6				4	45
7				5	55