

## Overview

# How should I price the books my publishing company is selling?

## Goal

By the end of this case, you will be familiar with variable and fixed references in Excel formulas, basic built-in Excel functions, and some keyboard shortcuts useful for inserting data in worksheets.

## Introduction

**Business Context.** You own an indie publishing company, *The Book Stash*, that specializes in literary fiction. Up until now, you have been dealing with pricing and cost negotiations in a very informal and intuitive way, but business has been growing recently, and you have realized that you need to start treating your numbers more professionally. Your current method has worked reasonably well so far, but it might not in the future.

**Business Problem.** You need to set up an Excel workbook to calculate the MSRP (Manufacturer's Suggested Retail Price) and the cost for each book you will be releasing this month, as well as the expected revenue, costs, and profits of your business.

**Analytical Context.** Your assistant has prepared an Excel workbook for you with some relevant descriptive quantities about the books for this month. You will work on it to calculate the required figures.

# Having a look at the data

Download and open the [workbook](#).

These are the columns present in the book data worksheet:

- **Book title:** The title of the book.
- **Author:** The author's name.
- **Estimated page count:** The number of pages that the finished design will have.
- **Paper weight:** The thickness of the paper. Paper thickness is measured in grams per square meter (gsm). The standard is 70 gsm, and all the books in this list will be printed on paper of that weight.
- **Cover type:** Either hardback or paperback. To cut down on costs, all your new books will be paperbacks.
- **Interior pages:** A book's interior pages can be printed using only black ink (BW) or colored ink (Color). Since these books are literature and not magazines, all of them will be printed in black-and-white.
- **Author's royalties per book sold:** This number corresponds to the dollars that will be paid to the author for each book sold. Across the industry, the standard is around 10% of the list price. You negotiated these numbers with the authors before knowing the exact list price, but from your experience, you know that these numbers will be reasonable.
- **Copies:** The number of copies of the book that will be printed. You negotiated these numbers with the author and your marketing manager.
- **Estimated demand (% copies sold):** The estimated percentage of all the copies produced that will be sold within the next three months. This number represents a worst-case scenario.

These are the columns in the printing costs worksheet:

- **Weight (gsm):** Paper weight in grams per square meter.
- **Cost per page BW:** Printing costs (in dollars) per page, using only black ink.
- **Cost per page Color:** Printing costs (in dollars) per page, using color inks.

Finally, these are the columns in the cover costs worksheet:

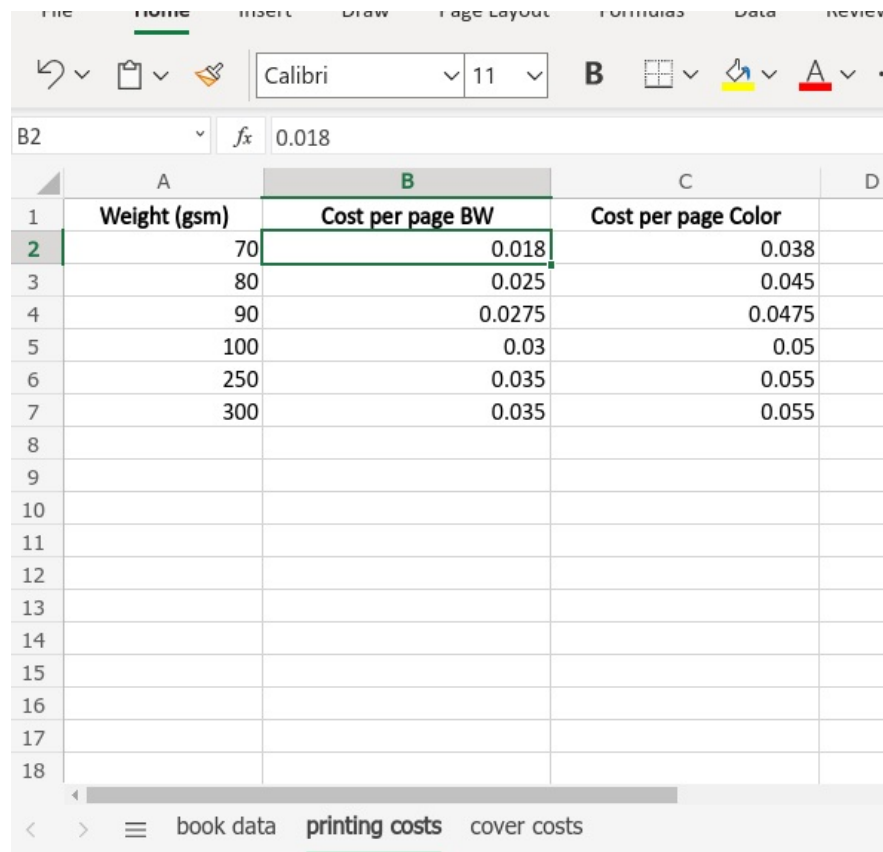
- **Type:** Paperback or hardback.
- **Cost:** Printer charges (in dollars) for binding each book with either a paperback or hardback cover.

## Calculating costs

Some factors that influence costs are the number of pages, the weight and quality of the paper, whether the book is paperback or hardback, whether the interior pages are black-and-white or color, the author's royalties, etc.

### Printing costs

If you go to the printing costs worksheet, you will see that the cost of printing one page varies depending on whether the printing is done in black-and-white or color, as well as the weight of the paper. All the books in our list will be printed using *70 gsm paper in black ink*, which means that the only cell that is relevant to us is B2:



	A	B	C	D
1	Weight (gsm)	Cost per page BW	Cost per page Color	
2	70	0.018	0.038	
3	80	0.025	0.045	
4	90	0.0275	0.0475	
5	100	0.03	0.05	
6	250	0.035	0.055	
7	300	0.035	0.055	
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				

### Example 1

Using Excel formulas, calculate the printing cost for all the books in the list.

▼ **Click here for the Answer to Example 1.**

The printing cost can be calculated with this formula:

$$\text{printing cost} = \text{number of pages} \times \text{cost per page}$$

Let's use what we already know about Excel formulas to create a new column in the book data worksheet containing each book's printing cost. Let's go to J2 and do the following:

	A	B	C	D	E	F
1	Book title	Author	Estimated page count	Paper weight	Cover type	In
2	Titan fading	Christopher A. Kelly	433	70 gsm	Paperback	BW
3	The killer in the glass	Madeline M. Rucker	380	70 gsm	Paperback	BW
4	Bionic moon	Suzanne R. Roberts	271	70 gsm	Paperback	BW
5	The chase of the hound	Mike C. Mercer	364	70 gsm	Paperback	BW
6	Death of the invisible	Williams H. Lewis	260	70 gsm	Paperback	BW
7	Poems at noon	Joseph S. Rosborough	132	70 gsm	Paperback	BW
8	The Shadowy Names	Larry K. Granger	175	70 gsm	Paperback	BW
9	Snake in the Way	Juana A. Cole	366	70 gsm	Paperback	BW
10	The Darkness of the Moon	Lisa D. Wheeler	468	70 gsm	Paperback	BW
11	Ships in the Moons	Lucy T. McLaughlin	185	70 gsm	Paperback	BW
12	Ice on the Window	Carlos E. Millsap	484	70 gsm	Paperback	BW
13	Lost shard	Derek M. Gonzales	428	70 gsm	Paperback	BW
14	The Roses of the Bridge	Ann C. Willis	333	70 gsm	Paperback	BW
15	Abandoned By The Ark	Melanie H. Rose	192	70 gsm	Paperback	BW
16	Broken Orbit	Justin A. Gregg	318	70 gsm	Paperback	BW
17	Stranger Of Nowhere	Jared E. Fason	118	70 gsm	Paperback	BW
18	Scourge Of The Outland	Raymond K. Hart	236	70 gsm	Paperback	BW

Can you see that the formula contains the name of the worksheet being referenced ('printing costs'!) followed by the cell being referenced in that worksheet? This is how we tell Excel in which worksheet the cells we want to reference are.

Let's now drag this cell down to copy the formula for all the other books:

	H	I	J	K	L
1	Book	Copies	Estimated demand (% copies)	Printing costs	
2	2.2	310	84%	7.794	
3	2.0	300	87%		
4	1.5	240	85%		
5	1.9	250	86%		
6	1.4	230	94%		
7	0.9	280	87%		
8	1.1	300	89%		
9	1.9	260	89%		
10	2.3	280	84%		
11	1.1	220	94%		
12	2.4	210	82%		
13	2.2	210	83%		
14	1.8	300	90%		
15	1.1	260	83%		
16	1.7	220	85%		
17	0.8	250	84%		
18	1.3	220	88%		

Oops - something went wrong here! What happened? Let's inspect some of the cells to find out:

	H	I	J	K	L
1	er book	Copies	ated demand (% copies	Printing costs	
2	2.2	310	84%	7.794	
3	2.0	300	87%	9.5	
4	1.5	240	85%	7.4525	
5	1.9	250	86%	10.92	
6	1.4	230	94%	9.1	
7	0.9	280	87%	4.62	
8	1.1	300	89%	0	
9	1.9	260	89%	0	
10	2.3	280	84%	0	
11	1.1	220	94%	0	
12	2.4	210	82%	0	
13	2.2	210	83%	0	
14	1.8	300	90%	0	
15	1.1	260	83%	0	
16	1.7	220	85%	0	
17	0.8	250	84%	0	
18	1.3	220	88%	0	

When we copied our formula down the column, it not only updated the number of pages (which we wanted it to) but also “updated” the cost per page! This occurs because, by default, Excel uses **variable references**, which means that whenever you copy a formula, all of the cell references within the formula are updated depending on the location of the copying destination cell. This is useful in many situations, but in this particular case, we need some of the inputs to be **fixed references** instead so that they remain the same regardless of where we are copying the formula.

To make a cell reference a fixed reference, you pre-append the dollar sign (\$) to both the column name and the row number in the formula, like this:

	A	B	C	D	E	F
1	Book title	Author	Estimated page count	Paper weight	Cover type	In
2	Titan fading	Christopher A. Kelly	433	70 gsm	Paperback	BW
3	The killer in the glass	Madeline M. Rucker	380	70 gsm	Paperback	BW
4	Bionic moon	Suzanne R. Roberts	271	70 gsm	Paperback	BW
5	The chase of the hound	Mike C. Mercer	364	70 gsm	Paperback	BW
6	Death of the invisible	Williams H. Lewis	260	70 gsm	Paperback	BW
7	Poems at noon	Joseph S. Rosborough	132	70 gsm	Paperback	BW
8	The Shadowy Names	Larry K. Granger	175	70 gsm	Paperback	BW
9	Snake in the Way	Juana A. Cole	366	70 gsm	Paperback	BW
10	The Darkness of the Moon	Lisa D. Wheeler	468	70 gsm	Paperback	BW
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18	Scourge Of The Outland	Raymond K. Hart	236	70 gsm	Paperback	BW

If we try copying the formula down the column now, we will see that no error appears. This time, we copied the formula using a nifty shortcut that saved us the effort of using the mouse. You first copy the cell with “Ctrl + C”,

then select all the cells that you want to fill with the formula using “Shift + ↓” (or “Ctrl + Shift + ↓”), and then use “Ctrl + V” to paste:

	H	I	J	K	L
1	Book	Copies	Estimated demand (% copies)	Printing costs	
2	.2	310	84%	7.794	
3	.0	300	87%		
4	.5	240	85%		
5	.9	250	86%		
6	.4	230	94%		
7	.9	280	87%		
8	.1	300	89%		
9	.9	260	89%		
10	.3	280	84%		
11	.1	220	94%		
12	.4	210	82%		
13	.2	210	83%		
14	.8	300	90%		
15	.1	260	83%		
16	.7	220	85%		
17	.8	250	84%		
18	.3	220	88%		

If we inspect the cells, we'll see that the formula was copied correctly!

	H	I	J	K	L
1	Book	Copies	Estimated demand (% copies)	Printing costs	
2	.2	310	84%	7.794	
3	.0	300	87%	6.84	
4	.5	240	85%	4.878	
5	.9	250	86%	6.552	
6	.4	230	94%	4.68	
7	.9	280	87%	2.376	
8	.1	300	89%	3.15	
9	.9	260	89%	6.588	
10	.3	280	84%	8.424	
11	.1	220	94%	3.33	
12	.4	210	82%	8.712	
13	.2	210	83%	7.704	
14	.8	300	90%	5.994	
15	.1	260	83%	3.456	
16	.7	220	85%	5.724	
17	.8	250	84%	2.124	
18	.3	220	88%	4.248	

# Exercise 1

## Cover costs

As for the covers, you can easily see that since all the books will be paperbacks, the only relevant cell in the `cover costs` worksheet will be cell B3:

B3										
	A	B	C	D	E	F	G	H	I	
1	Type	Cost								
2	Hardback	3								
3	Paperback	2								
4										
5	Note: Costs don't vary depending on paper size as long as it is kept to A5, Letter, or a smaller size.									

## Exercise 1

Using Excel formulas, calculate the sum of the printing costs and cover costs for all the books in the list. Put the results in a new column called `Printing & binding costs`.

## Other Costs and Exercise 2

### Other fixed costs

Your rule of thumb has always been that there are about 80 cents of other fixed costs per book. This includes all the costs of paying editors, proofreaders, designers, etc. There's no particular reason to change this rule now, so we will simply create a new worksheet called **other fixed costs** and add this quantity there. To create a new worksheet, we click on the plus sign to the right of the last worksheet tab:

New Window

Freeze Panes

Headings

Gridlines

Formula Bar

Default

A2

fx

Titan fading

	A	B	C	D	E
1	Book title	Author	Estimated page count	Paper weight	Cover type
2	Titan fading	Christopher A. Kelly	433	70 gsm	Paperback
3	The killer in the glass	Madelaine M. Rucker	380	70 gsm	Paperback
4	Bionic moon	Suzanne R. Roberts	271	70 gsm	Paperback
5	The chase of the hound	Mike C. Mercer	364	70 gsm	Paperback
6	Death of the invisible	Williams H. Lewis	260	70 gsm	Paperback
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9	SNAKE IN THE WAY	Juana A. Cole	366	70 gsm	Paperback
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11	Ships in the Moons	Lucy T. McLaughlin	185	70 gsm	Paperback
12	Ice on the Window	Carlos E. Millsap	484	70 gsm	Paperback
13	Lost shard	Derek M. Gonzales	428	70 gsm	Paperback
14	The Roses of the Bridge	Ann C. Willis	333	70 gsm	Paperback
15	Abandoned By The Arr	Melanie H. Rose	192	70 gsm	Paperback

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book data

printing costs

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Working...

Workbook Statistics

Next, we add the data:

The screenshot shows an Excel spreadsheet interface. The top ribbon includes tabs for Font (Calibri, size 11, bold), Cells (grid icon), Styles (color fill, text color), Layout (bullet points), Formulas (sum icon), and Data (sort, filter, conditional formatting). The spreadsheet grid has columns labeled A through K and rows numbered 1 through 18. The 'book data' tab is selected at the bottom, with other tabs visible: 'printing costs', 'cover costs', and 'other fixed costs'. A mouse cursor is pointing at the 'book data' tab.



## **Total cost**

Now that we know all the partial costs, it should be easy to compute the total cost.

## **Exercise 2**

Calculate the total cost per book. For this exercise, assume that the total cost is the sum of the printing costs, cover costs, other fixed costs, and royalties.

## Calculating the List Price & Exercise 3

### The publisher's markup

You always aim for a markup of 35% of the total cost so that you can turn a profit on your business. For example, if the total cost of producing a book is \$10, your markup would be \$3.50.

### Exercise 3

Create a new column called Publisher's markup with the markup in dollars for each book.

## Calculating MSRP & Exercise 4

### The discounted price and the MSRP

Retailers will almost always ask you for a discount of 40% on the MSRP. This means that

$$\text{Discounted price} = \text{MSRP} \times (100\% - 40\%) \quad (1)$$

$$= \text{MSRP} \times 0.6 \quad (2)$$

If we divide both sides of the equation by 0.6, we get

$$\text{MSRP} = \frac{\text{Discounted price}}{0.6}$$

Now, the discounted price will be your total costs plus your markup. As an example, let's say your total costs were 10 dollars, and your markup is 3.5 dollars. Therefore,

$$\text{MSRP} = \frac{13.5}{0.6} \quad (3)$$

$$= 22.5 \quad (4)$$

### Exercise 4

Using the formula above, create a new column called `Discounted price` and use it to compute the MSRP for each book (create a new column called `MSRP`). Remember that your discounted price is equal to your total costs plus your markup.

# Aggregate Statistics

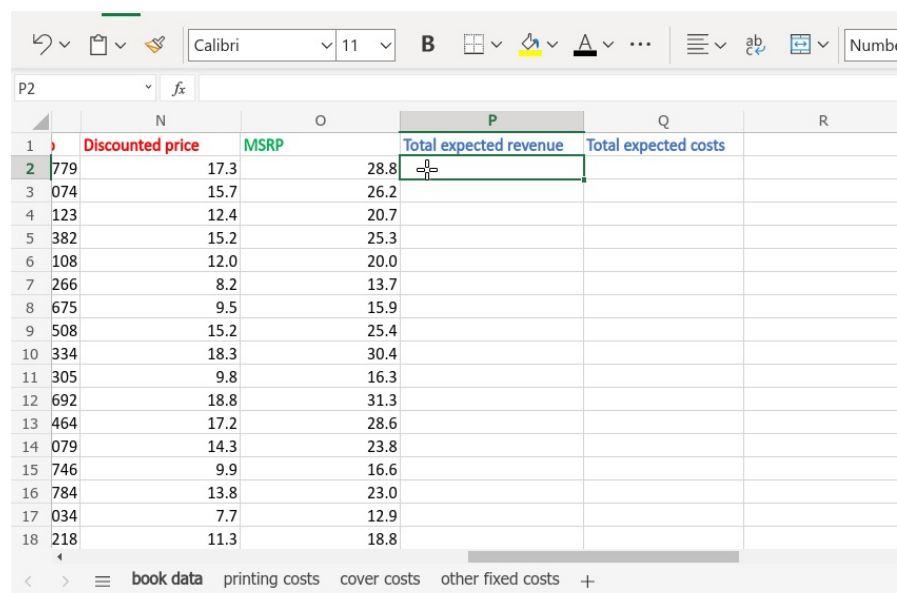
## Calculating some useful aggregate statistics

Having high-level statistics about what you've sold would be very convenient. After some thought, you decide that you want to know the sum of the total expected revenue, cost, and profits across all the books that you've sold. Additionally, you would like to know the average MSRP per page - that is, how much customers end up paying for each page on average. This number is very important because it can serve as a rule of thumb for how much a book could be priced based on its page count. You can use this as a rough estimate in the early stages of your negotiations with authors and retailers.

To calculate these aggregates, we first need to create two new columns, Total expected revenue and Total expected costs. These are the formulas:

$$\begin{aligned} \text{Total expected revenue} &= \text{Copies} \times \text{Estimated demand (\%)} \times \text{Discounted price} \\ \text{Total expected costs} &= \text{Copies} \times \text{Total cost} \end{aligned}$$

Notice that we only included the estimated demand percentage in the revenue formula. This is because you only receive revenue from the books that you *sell*, but you incur costs for all the books you *produce*, even if you don't sell them. Here's how to create the columns:



The screenshot shows a spreadsheet with the following data:

	N	O	P	Q	R
	Discounted price	MSRP	Total expected revenue	Total expected costs	
1	779	17.3	28.8		
2	074	15.7	26.2		
3	123	12.4	20.7		
4	382	15.2	25.3		
5	108	12.0	20.0		
6	266	8.2	13.7		
7	675	9.5	15.9		
8	508	15.2	25.4		
9	334	18.3	30.4		
10	305	9.8	16.3		
11	692	18.8	31.3		
12	464	17.2	28.6		
13	079	14.3	23.8		
14	746	9.9	16.6		
15	784	13.8	23.0		
16	034	7.7	12.9		
17	218	11.3	18.8		

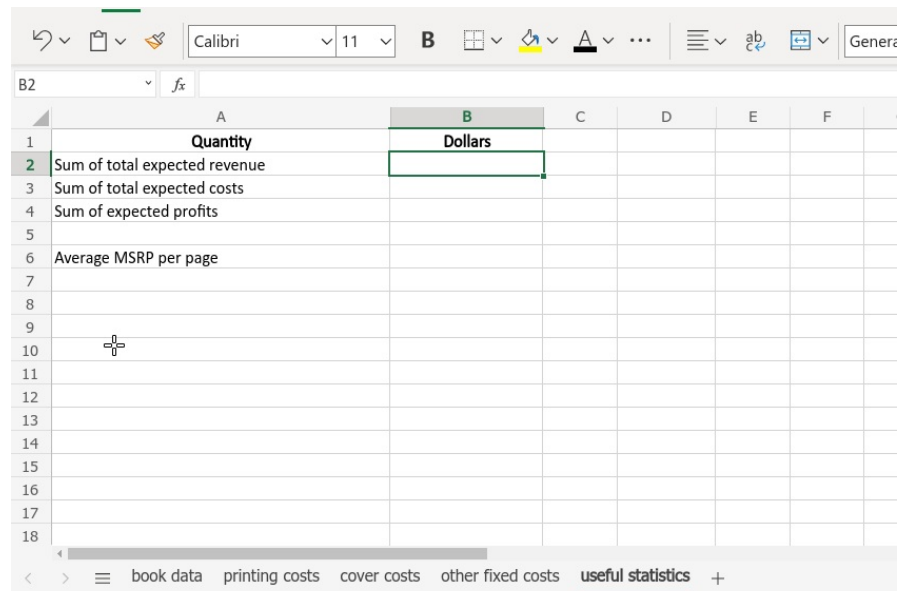
## Example 2

Calculate the total expected revenue across all sold books.

▼ **Click here for the solution.**

Let's create a new worksheet called `useful statistics` and add some cells with descriptive texts. We could calculate the total expected revenue by referencing and adding each book's revenue to a formula, one at a time. But this would be very time-consuming, particularly for hundreds or thousands of books!

Is there a way we can cut down on this effort? There sure is! We can use Excel's built-in **SUM()** function and reference the relevant column (not just a single cell!) in the `book data` worksheet. How do we do that? Well, you reference a range in a formula by clicking on the first cell and dragging the cursor down the column. Then you type the closing parenthesis to exit selection mode:



To tell Excel to format the number as a currency, we right-clicked the cell and selected the dollar sign from the pop-up menu.

You can also directly type in the cell range if you don't want to use the mouse. A cell range is represented with this syntax: `firstcell:lastcell`. For instance, if you want to sum cells A2, A3, A4, and A5, you write `=SUM(A2:A5)`. As an example, here we sum the total expected revenues of the first five cells:

File Home Insert Draw Page Layout Formulas Data Review View Automate Help

Calibri 11 B

R2

	O	P	Q	R	S
1	MSRP	Total expected revenue			
2	.3	28.8	4497.60276		
3	.7	26.2	4101.354		
4	.4	20.7	2527.6212		
5	.2	25.3	3265.893		
6	.0	20.0	2591.8056		
7	.2	13.7	1998.15336		
8	.5	15.9	2541.1725		
9	.2	25.4	3526.25832		
10	.3	30.4	4294.14048		
11	.8	16.3	2018.4714		
12	.8	31.3	3234.12264		
13	.2	28.6	2989.31472		
14	.3	23.8	3861.513		
15	.9	16.6	2143.02348		
16	.8	23.0	2581.0488		
17	.7	12.9	1622.754		
18	.3	18.8	2181.83328		

book data printing costs cover costs other fixed costs useful statistics +

## Exercise 5

Calculate the total expected costs across all sold books.

## Exercise 6

Calculate the total expected profits across all sold books.

**Hint:** Total profits would be the difference between the total expected revenues and the total expected costs.



## Exercise 7

Calculate the average MSRP per page. In order to do this, you will need to create a new column in the book data worksheet (call it MSRP per page), that tells you the MSRP per page for each book. Then, back on the useful statistics worksheet, you will have to use the **AVERAGE()** function to compute the average across all books. The syntax is similar to that of the **SUM()** function; i.e., you pass the cell range as the input for the function.

## Conclusions & Takeaways

In this case, you have successfully created a workbook to calculate the list price of all the titles your small printing press will release next month, as well as some high-level statistics about your business. You have made use of multiple Excel tools like the following:

- Variable references - These are the default in Excel. They update the cell references depending on the location of the paste destination
- Fixed references - These don't update when you copy and paste a formula. You can make a reference fixed by adding \$ both to the beginning of the column name and the beginning of the row name (before the letter and before the number, e.g., \$A\$2). You can also fix only the column or only the row. If you want the column to be fixed, you add the \$ to the column name only (before the letter, e.g., \$A2); if you want the row to be fixed, you add the \$ to the row name only (before the number, e.g., A\$2).
- Built-in functions - To sum a range of cells, you can use the SUM( ) function and pass the cell range as the input. To calculate averages, you use AVERAGE( )