Spreadsheets 2.0

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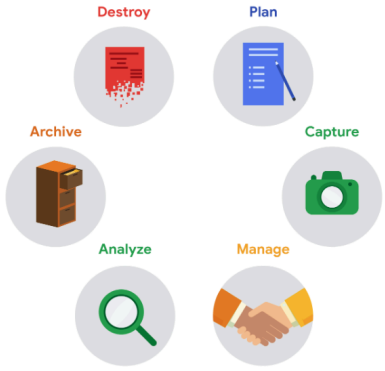
Common Math Functions
L> Sum
L> Average
L> Count
L> Min
L> Max

Spreadsheet Tasks
L> Organise your data
  L> Pivot Table
    L> Sort & Filter
L> Calculate Your Data
  L> Formulas

Repetition - Data Live Cycle

To better understand the benefits of using spreadsheets in data analytics, let's explore how they relate to each phase of the data life cycle: **plan, capture, manage, analyze, archive,** and **destroy**.



1. **Set organizational standards**: Use consistent formatting, clear headings, colour schemes, and data order to improve clarity, efficiency, and consistency.
2. **Capture data by the source**: Connect spreadsheets to external sources like online surveys or databases to keep information automatically updated and accurate.
3. **Manage different kinds of data**: Use spreadsheets to store, organize, filter, and update information while controlling access and ensuring data security.
4. **Analyse data**: Apply formulas and pivot tables to summarize information and support better, data-driven decisions.
5. **Archive spreadsheets**: Store rarely used spreadsheets with built-in archiving tools to preserve historical data for future reference.
6. **Destroy spreadsheets**: Permanently delete spreadsheets that are no longer needed, either for security, legal compliance, or because better backups exist.

Spreadsheet Tipp: You can copy and paste formulas

Datei auswählen Keine ausgewählt

Cheat Sheet - Spreadsheet

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Häufig verwendete Aktionen	
Spalte auswählen	**Strg** + **Leertaste**
Zeile auswählen	**Umschalttaste** + **Leertaste**
Alle auswählen	⌘ + **A** ⌘ + **Umschalttaste** + **Leertaste**
Rückgängig machen	⌘ + **Z**
Wiederholen	⌘ + **Y** ⌘ + **Umschalttaste** + **Z** **Fn** + **F4**
Suchen	⌘ + **F**
Suchen und ersetzen	⌘ + **Umschalttaste** + **H**
Bereich ausfüllen	⌘ + **Eingabetaste**
Unten ausfüllen	⌘ + **D**
Rechts ausfüllen	⌘ + **R**
Speichern *(Alle Änderungen werden automatisch in Google Drive gespeichert.)*	⌘ + **S**
Öffnen	⌘ + **O**
Drucken	⌘ + **P**
Kopieren	⌘ + **C**
Ausschneiden	⌘ + **X**
Einfügen	⌘ + **V**
Nur Werte einfügen	⌘ + **Umschalttaste** + **V**
Häufig verwendete Tastenkombinationen anzeigen	⌘ + **/**
Neues Tabellenblatt einfügen	**Umschalttaste** + **Fn** + **F11**
Kompakte Steuerelemente	**Strg** + **Umschalttaste** + **F**
Input Tools ein/aus *(in Tabellen mit nicht-lateinischem Schriftsystem verfügbar)*	⌘ + **Umschalttaste** + **K**

Input Tools ein/aus *(in Tabellen mit nicht-lateinischem Schriftsystem verfügbar)*	⌘ + **Umschalttaste** + **K**
Input Tools auswählen	⌘ + **Wahltaste** + **Umschalttaste** + **K**
Tool-Finder *(früher „In Menüs suchen“)*	**Wahltaste** + **/**
Aktuellen Bereich um die ausgewählte Zelle herum auswählen	⌘ + **Umschalttaste** + *** **Strg** + **Umschalttaste** + *
Menüs ein- oder ausblenden	⌘ + **Wahltaste** + **R** **Strg** + **Umschalttaste** + **F**
Bereich in Tabelle konvertieren	⌘ + **Alt** + **T**

Zellen formatieren	
Fett	⌘ + **B** ⌘ + **2** **Strg** + **2**
Unterstrichen	⌘ + **u** ⌘ + **4** **Strg** + **4**

Datei a

Kursiv	⌘ + **I** ⌘ + **3** **Strg** + **3**
Durchgestrichen	⌘ + **Umschalttaste** + **X** ⌘ + **5** **Strg** + **5**
Zentriert	⌘ + **Umschalttaste** + **E**
Linksbündig	⌘ + **Umschalttaste** + **L**
Rechtsbündig	⌘ + **Umschalttaste** + **R**
Rahmenlinie oben	**Wahltaste** + **Umschalttaste** + **1**
Rahmenlinie rechts	**Wahltaste** + **Umschalttaste** + **2**
Rahmenlinie unten	**Wahltaste** + **Umschalttaste** + **3**
Rahmenlinie links	**Wahltaste** + **Umschalttaste** + **4**
Rahmenlinien entfernen	**Wahltaste** + **Umschalttaste** + **6**
Rahmenlinien außen	**Wahltaste** + **Umschalttaste** + **7** ⌘ + **Umschalttaste** + **7** **Strg** + **Umschalttaste** + **7**

Link einfügen	⌘ + **K**
Uhrzeit einfügen	⌘ + **Umschalttaste** + **;**
Datum einfügen	⌘ + **;**
Datum und Uhrzeit einfügen	⌘ + **Wahltaste** + **Umschalttaste** + **;**
Als Dezimalzahl formatieren	**Strg** + **Umschalttaste** + **1**
Als Uhrzeit formatieren	**Strg** + **Umschalttaste** + **2**
Als Datum formatieren	**Strg** + **Umschalttaste** + **3**
Als Währung formatieren	**Strg** + **Umschalttaste** + **4**
Als Prozentwert formatieren	**Strg** + **Umschalttaste** + **5**
Als Exponenten formatieren	**Strg** + **Umschalttaste** + **6**
Formatierung entfernen	⌘ + ****

In Tabellen navigieren	
Zum Anfang der Zeile wechseln	**Fn** + **Linkspfeil**
Zum Anfang des Tabellenblatts wechseln	⌘ + **Fn** + **Linkspfeil**
Zum Ende der Zeile wechseln	**Fn** + **Rechtspfeil**
Zum Ende des Tabellenblatts wechseln	⌘ + **Fn** + **Rechtspfeil**
Zur aktiven Zelle scrollen	⌘ + **Rücktaste**
Zum nächsten Tabellenblatt wechseln	**Wahltaste** + **Abwärtspfeil** **MacBook:** **Wahltaste** + **Rechtspfeil**
Zum vorherigen Tabellenblatt wechseln	**Wahltaste** + **Aufwärtspfeil** **MacBook:** **Wahltaste** + **Linkspfeil**
Liste der Tabellenblätter einblenden	**Wahltaste** + **Umschalttaste** + **K**
Hyperlink öffnen	**Wahltaste** + **Eingabetaste**
"Erkunden" öffnen	⌘ + **Wahltaste** + **Umschalttaste** + **I**
Zur Seitenleiste gehen	⌘ + **Wahltaste** + **.** ⌘ + **Wahltaste** + **,**
Fokus aus Tabelle verschieben	**Strg** + ⌘ + **Umschalttaste** + **M**
Fokus auf Zusammenfassung verschieben *(wenn ein Zellenbereich ausgewählt ist)*	**Wahltaste** + **Umschalttaste** + **Q**
Fokus auf Pop-up verschieben *(für Links, Lesezeichen und Bilder)*	**Strg** + ⌘ gedrückt halten, **E** drücken dann **P** drücken

Drop-down-Menü in gefilterter Zelle öffnen	**Strg** + ⌘ + **R**
Überarbeitungsverlauf öffnen	⌘ + **Wahltaste** + **Umschalttaste** + **H**
Zeichnungen-Editor schließen	⌘ + **Esc** **Umschalttaste** + **Esc**
Dialogfeld „Bereich eingeben“ anzeigen	**Strg** + **G**
„Suchen und ersetzen“, mit dem ausgewählten Tab „Suchen“	**Strg** + **F**

Notizen und Kommentare bearbeiten	
Notiz einfügen/bearbeiten	**Umschalttaste** + **F2**
Kommentar einfügen/bearbeiten	⌘ + **Wahltaste** + **M**
Diskussionsthread für Kommentar öffnen	⌘ + **Wahltaste** + **Umschalttaste** + **A**
Aktuellen Kommentar öffnen	**Strg** + ⌘ gedrückt halten, **E** drücken dann **C** drücken
Zum nächsten Kommentar wechseln	**Strg** + ⌘ gedrückt halten, **N** drücken dann **C** drücken
Zum vorherigen Kommentar wechseln	**Strg** + ⌘ gedrückt halten, **P** drücken dann **C** drücken
Tastenkombinationen für ausgewählte Kommentare verwenden	
Auf aktuellen Kommentar antworten	**R**
Zum nächsten Kommentar wechseln	**J**
Zum vorherigen Kommentar wechseln	**K**
Aktuellen Kommentar klären	**E**
Aktuellen Kommentar verlassen	**U**

Menüs öffnen	
Menü "Datei"	**Strg** + **Wahltaste** + **F**
Menü „Bearbeiten“	**Strg** + **Wahltaste** + **E**
Menü aufrufen	**Strg** + **Wahltaste** + **V**
Menü „Einfügen“	**Strg** + **Wahltaste** + **I**
Menü „Format“	**Strg** + **Wahltaste** + **O**
Menü "Daten"	**Strg** + **Wahltaste** + **D**
Menü „Tools“	**Strg** + **Wahltaste** + **T**
Menü „Einfügen“ öffnen	⌘ + **Wahltaste** + **=** (bei ausgewählten Zellen)
Menü „Löschen“ öffnen	⌘ + **Wahltaste** + **-** (bei ausgewählten Zellen)
Menü „Formular“ *(sichtbar, wenn die Tabelle mit einem Formular verknüpft ist)*	**Strg** + **Wahltaste** + **M**
Menü „Add-ons“	**Strg** + **Wahltaste** + **N**
Menü „Hilfe“	**Strg** + **Wahltaste** + **H**
Menü „Bedienungshilfen“ *(sichtbar, wenn Screenreader-Unterstützung aktiviert ist)*	**Strg** + **Wahltaste** + **A**
Menü "„Tabellenblatt“ *(Kopieren, Löschen und andere Aktionen für Tabellenblätter)*	**Wahltaste** + **Umschalttaste** + **S**
Kontextmenü	⌘ + **Umschalttaste** + **** **Umschalttaste** + **F10**
Menü für Tabellenspalten	⌘ + **Wahltaste** + ****

Zeilen und Spalten hinzufügen oder ändern	
Zeilen oberhalb einfügen	⌘ + **Wahltaste** + **=** (bei ausgewählten Zeilen)

	Zeilen) **Strg** + **Wahltaste** + **I, R** drücken dann **R** drücken
Zeilen unterhalb einfügen	**Strg** + **Wahltaste** + **I, R** drücken dann **B** drücken
Spalten links einfügen	**⌘** + **Wahltaste** + **=** (bei ausgewählten Spalten) **Strg** + **Wahltaste** + **I, C** drücken dann **C** drücken
Spalten rechts einfügen	**Strg** + **Wahltaste** + **I, C** drücken dann **O** drücken
Zeilen löschen	**⌘** + **Wahltaste** + **-** (bei ausgewählten Zeilen) **Strg** + **Wahltaste** + **E**, dann **D**, dann **D**
Spalten löschen	**⌘** + **Wahltaste** + **-** (bei ausgewählten Spalten) **Strg** + **Wahltaste** + **E**, dann **D**, dann **E**
Zeile ausblenden	**⌘** + **Wahltaste** + **9**
Zeile einblenden	**⌘** + **Umschalttaste** + **9**
Spalte ausblenden	**⌘** + **Wahltaste** + **0**
Spalte einblenden	**⌘** + **Umschalttaste** + **0**
Zeilen oder Spalten gruppieren	**Wahltaste** + **Umschalttaste** + **Rechtspfeil**
Gruppierung von Zeilen oder Spalten aufheben	**Wahltaste** + **Umschalttaste** + **Linkspfeil**
Gruppierte Zeilen oder Spalten maximieren	**Wahltaste** + **Umschalttaste** + **Abwärtspfeil**
Gruppierte Zeilen oder Spalten minimieren	**Wahltaste** + **Umschalttaste** + **Aufwärtspfeil**

Formeln verwenden	
Alle Formeln anzeigen	**Strg** + **~**
Matrixformel einfügen	**⌘** + **Umschalttaste** + **Eingabetaste**
Maximierte Matrixformel minimieren	**⌘** + **E**
Formelhilfe ein-/ausblenden *(beim Eingeben einer Formel)*	**Umschalttaste** + **Fn** + **F1**
Vollständige/kompakte Formelhilfe *(beim Eingeben einer Formel)*	**Fn** + **F1**
Absolute/relative Bezüge *(beim Eingeben einer Formel)*	**Fn** + **F4**
Vorschau der Formelergebnisse ein-/ausblenden *(beim Eingeben einer Formel)*	**Fn** + **F9**
Größe der Formelleiste ändern *(nach oben oder unten verschieben)*	**Strg** + **Wahltaste** + **Aufwärtspfeil** und **Strg** + **Wahltaste** + **Abwärtspfeil**
Auswahl des Formelbereichs ein-/ausschalten *(beim Eingeben einer Formel)*	**F2** **Strg** + **E**
Hilfe für Screenreader	
Screenreader-Unterstützung aktivieren *Weitere Informationen zur Verwendung von Google Sheets mit einem Screenreader*	**⌘** + **Wahltaste** + **Z**
Unterstützung für Braille aktivieren	**⌘** + **Wahltaste** + **H**
Spalte vorlesen	**⌘** + **Wahltaste** + **Umschalttaste** + **C**
Zeile vorlesen	**⌘** + **Wahltaste** + **Umschalttaste** + **R**

Public Data Sources

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World Bank

World Health Organisation

Google Public Data Explorer

U.S. Census Bureau

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Formulas For Success

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Formula
L> set of instructions
L> performs a specific calculation

Operator
L> formulas are built on them
L> symbol that names the type of operation
L> or calculation to be performed
L> e.g. the plus sign *("+")*

Expressions
L> they way we use formulas & operators
L> e.g. 3-1, 15+8/2, 846x513

Cell Reference
L> cell or range of cells
L> that can be used in a formula

Range
L> a collection of 2 or more cells

Count If - Formula
L> =COUNTIF(A1:A16, “7”)
L> now will only count numbers with 7

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Errors & Formulas

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#DIV/0!
L> formula is trying to divide a value
in a cell by 0 or by an empty cell

Using *"If - Error" Formula*
L> e.g. IFERROR(B4/A4, "Not applicable")
L> will help to show another message

#ERROR!
L> formula can't be interpreted as input
L> also known as "*parsing error*"
L> e.g. comma in formula is missing

Using *"SUM" Formula*
L> e.g. SUM(B2:B6, C2:C6)
L> adds all things together for you

#N/A
L> data in a formula can't be found by spreadsheet
L> means that data doesn't exist
L> often appears using functions like VLOOKUP
L> the word to search was not identic with the other words

Using "VLOOKUP" Formula
L> e.g. =VLOOKUP(A24, $A$3:$B$18, 2, 0)
L> searches for a certain value in a column
L> to return a corresponding piece of information
L> A24 = what he has to look for
L> A3:B18 = the area he has to look in
L> 2, 0 = how many rows/columns he should take over

#Name?
L> formula or function name isn't understood
L> the VLOOKUP had one O too much - VLOOOKUP

#NUM!
L> formula or function calculation can't be performed as specified
L> in *"DATEDIF"* the later date is earlier - causing the error

Using *"DATEDIF"* Formula
L> calculates the difference between two dates
L> e.g. =DATEDIF(B6, C6, "M")
L> *"M"* is the unit and communicates *"month"*

#VALUE!
L> general error
L> could indicate problem with formula or referenced cells
L> it is not immediately clear, what the error is
L> in our example DATAFDIF had a name instead of a date in cell

#REF!
L> formula is referencing a cell that is no longer valid
L> formula is referencing a cell that has been deleted
L> in our example we deleted a whole row, causing it
[L> SUM can handle it somehow, normal adding not]

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Errors & Formulas 2.0

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Best Practice To Avoid Errors

1. Filter data to make your spreadsheet less complex and busy.
2. Use and freeze headers so you know what is in each column, even when scrolling.
3. When multiplying numbers, use an asterisk (`*`) not an `x`.
4. Start every formula and function with an equal sign (`=`).
5. Whenever you use an open parenthesis, make sure there is a closed parenthesis on the other end to match.
6. Change the font to something easy to read.
7. Set the border colors to white so that you are working in a blank sheet.
8. Create a tab with just the raw data, and a separate tab with just the data you need.

Repetition Of Learned Errors

Error	Description	Example
#DIV/0!	A formula is trying to divide a value in a cell by 0 (or an empty cell with no value)	`=B2/B3`, when the cell B3 contains the value 0
#ERROR!	(Google Sheets only) Something can't be interpreted as it has been input. This is also known as a parsing error.	`=COUNT(B1:D1 C1:C10)` is invalid because the cell ranges aren't separated by a comma
#N/A	A formula can't find the data	The cell being referenced can't be found
#NAME?	The name of a formula or function used isn't recognized	The name of a function is misspelled
#NUM!	The spreadsheet can't perform a formula calculation because a cell has an invalid numeric value	`=DATEDIF(A4, B4, "M")` is unable to calculate the number of months between two dates because the date in cell A4 falls after the date in cell B4
#REF!	A formula is referencing a cell that isn't valid	A cell used in a formula was in a column that was deleted
#VALUE!	A general error indicating a problem with a formula or with referenced cells	There could be problems with spaces or text, or with referenced cells in a formula; you may have additional work to find the source of the problem.

Conditional Formatting

L> *"=ISERROR(A1)"* can point out errors in colour for us!

Conditional formatting in Google Sheets

To set up conditional formatting in Google Sheets to highlight all cells in a spreadsheet that contain errors, do the following:

1. Click the empty rectangle above row number 1 and to the left of Column A to select all cells in the spreadsheet. In the Step-by-step in spreadsheets video, this was called the **Select All** button.
2. From the main menu, click **Format** and select **Conditional Formatting** to open the Conditional format rules pane on the right.
3. While in the **Single Color** tab, under Format rules, use the drop-down to select **Custom formula is,** enter `=ISERROR(A1)`, select yellow (or any other color) for the formatting style, and then click **Done**.

To remove conditional formatting, click **Format** and select **Conditional Formatting,** and then click the **Trash** icon for the format rule.

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Errors & Fixes [PDF]

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Spreadsheet Errors and Fixes

When you are new to data analytics—and sometimes even when you aren't—spreadsheet struggles are real. It never feels good when you type in what you are sure is a perfect formula or function, only to get an error message. Understanding errors and how to fix them is a big part of keeping your data clean, so it's important to know how to deal with issues as they come up, and more importantly, not to get discouraged.

Remember, even the most advanced spreadsheet users come across problems from time to time. In this reading, you will learn about common errors and how to fix them.

But first, here are a few best practices and helpful tips. These strategies will help you avoid spreadsheet errors to begin with, making your life in analytics a whole lot less stressful:

1. Filter data to make your spreadsheet less complex and busy.
2. Use and freeze headers so you know what is in each column, even when scrolling.
3. When multiplying numbers, use an asterisk (*) not an X.
4. Start every formula and function with an equal sign (=).
5. Whenever you use an open parenthesis, make sure there is a closed parenthesis on the other end to match.
6. Change the font to something easy to read.
7. Set the border colors to white so that you are working in a blank sheet.
8. Create a tab with just the raw data, and a separate tab with just the data you need.

Now that you have learned some basic ways to avoid errors, you can focus on what to do when that dreaded pop-up does appear. The following table lists common spreadsheet errors and examples of each. Knowing what the errors mean takes some of the fear out of getting them.

Error	Description	Example
#DIV/0!	A formula is trying to divide a value in a cell by 0 (or an empty cell with no value)	=B2/B3, when the cell B3 contains the value 0
#ERROR!	(Google Sheets only) Something can't be interpreted as it has been input. This is also known as a parsing error.	=COUNT(B1:D1 C1:C10) is invalid because the cell ranges aren't separated by a comma
#N/A	A formula can't find the data	The cell being referenced can't be found
#NAME?	The name of a formula or function used isn't recognized	The name of a function is misspelled
#NUM!	The spreadsheet can't perform a formula	=DATEDIF(A4, B4, "M") is unable to calculate the

Datei a

	calculation because a cell has an invalid numeric value	number of months between two dates because the date in cell A4 falls after the date in cell B4
#REF!	A formula is referencing a cell that isn't valid	A cell used in a formula was in a column that was deleted

#VALUE!	A general error indicating a problem with a formula or with referenced cells	There could be problems with spaces or text, or with referenced cells in a formula; you may have additional work to find the source of the problem.

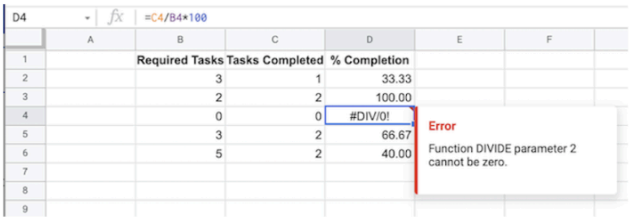
The next sections provide examples of these errors and possible solutions. There is also provide a pro tip at the end of this reading about how you can spot errors quickly in your spreadsheet by using conditional formatting.

Tip: If you are new to spreadsheets, focus on the descriptions of the errors in the previous table. Spend some time working with spreadsheets and then come back to read the examples below.

#DIV/0!

A #DIV/0! error means that your formula is trying to divide a value in a cell by 0, or by an empty cell (with no value). In math, dividing by zero doesn't make sense. Dividing by zero doesn't make sense in spreadsheets either.

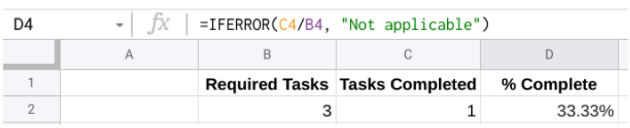
Assume you are trying to calculate the percentage of required tasks that have been completed in a project. Column B has the number of required tasks and Column C has the number of completed tasks. You enter the formula **=C2/B2*100** in cell D2 to calculate the percentage of completion. You copy the formula to the rest of the cells in Column D, but there is a #DIV/0! error in cell D4. No tasks are required for that particular line item so the formula is trying to divide by 0 in cell B4.



B1: Required tasks B2: 3 B3: 2 B4: 0 B5: 3 B6: 5 C1: Tasks completed C2: 1 C3: 2 C4: 0 C5: 2 C6: 2 D1: % completion D2: 33.33 D3: 100.0 D4: #DIV/0! (Error: function DIVIDE parameter 2 cannot be zero) D5: 66.67 D6: 40.0

You could delete row 4, but if things change and tasks are required for that line item in the future, you would have to insert that row back into the spreadsheet.

A better solution is to have the spreadsheet enter "Not applicable" whenever a cell in the B column contains a 0 and causes the divide by zero error.



3		2	2	100.00%
4		0	0	Not applicable
5		3	2	66.67%
6		5	2	40.00%
7				

Fixing the error

Change the formula in the D column cells so the formula in cell D4 changes from =C4/B4*100 to **=IFERROR(C4/B4*100, "Not applicable")**. The results are still the same for all other cells in the D column, but the #DIV/0! error no longer appears in cell D4.

The **IFERROR** function returns the first argument (calculation) if it is not an error value, or returns the second argument when there is an error. In the example, C4/B4*100 is the first argument and "Not applicable" is the second argument.

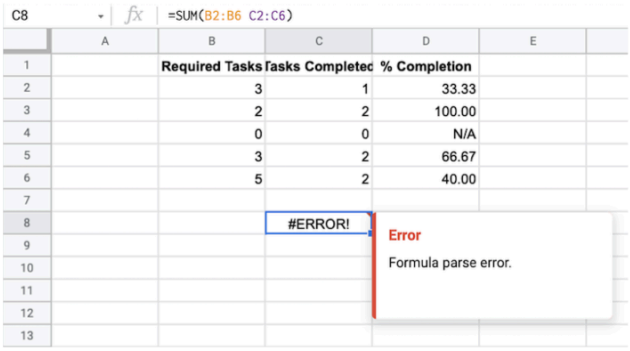
#ERROR!

A #ERROR! error can occur if you have specified two or more cell ranges without a comma as the delimiter to separate them. The spreadsheet can't figure out what the true cell ranges are.

The following ranges written without a comma cause #ERROR! to appear:

=COUNT(B1:D1 C1:C10)

=SUM(B2:B6 C2:C6)



B1: Required tasks B2: 3 B3: 2 B4: 0 B5: 3 B6: 5 C1: Tasks completed C2: 1 C3: 2 C4: 0 C5: 2 C6: 2 D1: % completion D2: 33.33 D3: 100.0 D4: N/A D5: 66.67 D6: 40.0 C8: #ERROR! (formula parse error)

Fixing the error

You can fix these errors by replacing the space between the cell ranges with a comma.

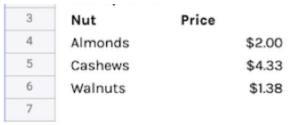
=COUNT(B1:D1,C1:C10) instructs the spreadsheet to count the number of values from cell B1 through cell D1 and from C1 through C10.

=SUM(B2:B6,C2:C6) instructs the spreadsheet to add the values in cell B2 through cell B6 and from cell C2 through cell C6.

Refer to the support pages for COUNT and SUM for additional information. These functions will be covered later in the program.

#N/A

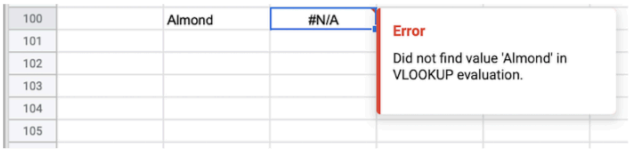
A #N/A error tells you that the data in your formula or function can't be found by the spreadsheet. Generally, this means the data doesn't exist. This error most often occurs when you are using functions like **VLOOKUP** to look up a value in a spreadsheet based on matching criteria. For example, if the following lookup table is at the top of a large spreadsheet, the spreadsheet could automatically look up and fill in the price of almonds anywhere in the spreadsheet that you have inserted a VLOOKUP function.



	Nut	Price
4	Almonds	$2.00
5	Cashews	$4.33
6	Walnuts	$1.38

B2: Lookup Table B3: Nut B4: Almonds B5: Cashews B6: Walnuts C3: Price C4: $2.00 C5: $4.33 C6: $1.38

Assume cell C100 in the spreadsheet contains the formula: **=VLOOKUP(B100, $B$4:$C$6, 2, 0)**. This formula should compare the text in cell B100 with Almonds, Cashews, or Walnuts in the lookup table and insert the price for the matching nut in cell C100. But there is a #N/A error in cell C100 because the price for **Almond** doesn't exist in the lookup table. The plural, **Almonds**, is in the lookup table.



Refer to the VLOOKUP support page for the syntax and usage of this function. VLOOKUP will be covered in more detail later in the program.

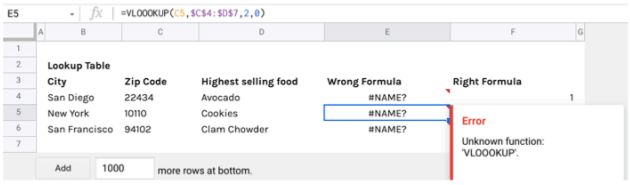
Fixing the error

To fix the error, change **Almond** in cell B100 to **Almonds**. This will enable the spreadsheet to automatically find and insert the price for almonds from the lookup table, $2.00 in cell C4, into cell C100.

#NAME?

A #NAME? error means that your spreadsheet needs help understanding your formula or function. To solve #NAME? errors, the first step is to check your spelling. Then, be sure to use the full name for any formulas or functions. Spreadsheet applications will suggest formulas and functions for you so it is a good idea to make use of this feature.

Here is an example of a #NAME? error resulting from an extra O in the VLOOKUP function. The spreadsheet is trying to use **VLOOOKUP** which doesn't exist.



Same spreadsheet as the previous example. Cell E5 in the Wrong Formula has been selected. The error message reads "Unknown function: 'VLOOOKUP'." The formula reads "=VLOOOKUP(C5,$C$4:$D$7,2,0)" with an extra O in VLOOKUP.

Fixing the error

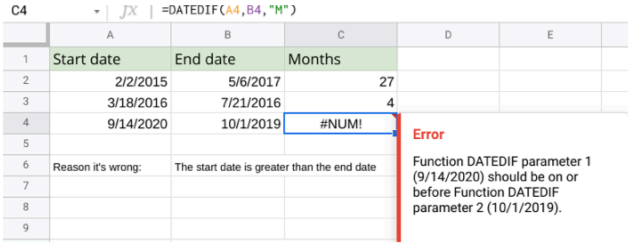
To fix the error, change **VLOOOKUP** to **VLOOKUP** in the formula in cell E5.

#NUM!

A #NUM! error means that the spreadsheet can't perform a calculation as specified. This can happen for a few reasons. The numbers might be too big or small for the spreadsheet to process, the calculation might be impossible, or there is something wrong with the variables that have been input. To fix a #NUM! error, your best bet is to just return to your formula and double-check it.

In the example below, the spreadsheet can't execute the DATEDIF formula because the Start Date is after the End Date; this needs to be corrected before the formula will work.

Refer to the DATEDIF support page for more information about the syntax and usage.



Screenshot of a spreadsheet. There are three columns: Start date, End date, and Months. In the Start date column, it lists 2/2/2015, 3/18/2016, and 9/14/2020. In the End date column, it lists 5/6/2017, 7/21/2016, and 10/1/2019. In the Months column, it lists 27, 4, and a #NUM! Error. The cell with the error, C4, has been selected; The formula reads "=DATEDIF(A4,B4,"M")." The error message reads "Function DATEDIF parameter 1 (9/14/2020) should be on or before Function DATEDIF parameter 2 (10/1/2019)." Underneath the table, there is text: "Reason it's wrong: the start date is greater than the end date."

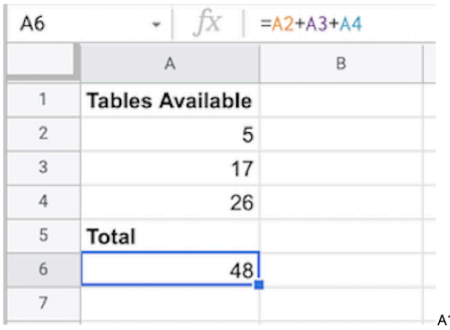
Fixing the error

Change the date in cell A4 from **9/14/2020** to **10/1/2019** and the date in cell B4 from **10/1/2019** to **9/14/2020**. The dates will be in the correct order for the formula to work, and the error will no longer appear.

#REF!

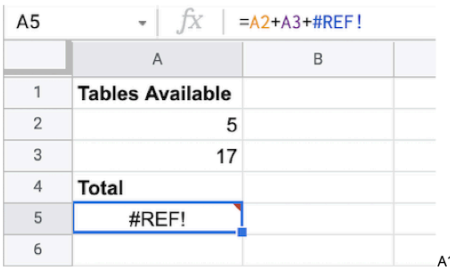
A #REF! error tells you that your formula or function is referencing a cell that is no longer valid. A cell (or range of cells) may be missing because it was deleted.

In the example below, a simple formula is adding the values in cells A2, A3, and A4.



A1: Tables available A2: 5 A3: 17 A4: 26 A5: Total A6: 48

If you delete row 4 (and the value 26 in cell A4), the #REF! error appears and the spreadsheet can no longer calculate the total.



A1: Tables available A2: 5 A3: 17 A4: Total A5: #REF!

Fixing the error

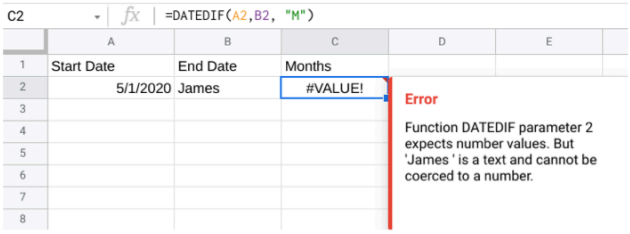
You can fix the error by updating the formula in cell A5 to add the values from cell A2 and cell A3 only. **=A2+A3**

#VALUE!

A #VALUE! error is a general error that could indicate a problem with a function or referenced cells. It might not be clear right away what the problem is, so this error could require a little more effort to fix.

If you are working with Microsoft Excel, there is an interactive page, How to correct a #VALUE! error, that can help you narrow down the cause of this error. You can select a specific function from a drop-down list to display a link to tips to fix the error when using that function.

In the example below, a text string "James" is in End Date column instead of a date. The spreadsheet can't perform the =DATEDIF(A2,B2, "M") calculation.



Screenshot of a spreadsheet. There are three columns: Start Date, End Date, and Months. Under Start Date, it contains 5/1/2020. Under End Date, it contains the name James. The formula reads "=DATEDIF(A2,B2, "M")."There is a #VALUE! Error under the Months column; the message reads "Function DATEDIF parameter 2 expects number values. But 'James ' is a text and cannot be coerced to a number."

Fixing the error

Replace "James" in cell B2 with an end date in the right format, and the error will no longer appear.

Pro tip: spotting errors in spreadsheets with conditional formatting

Conditional formatting can be used to highlight cells a different color based on their contents. This feature can be extremely helpful when you want to locate all errors in a large spreadsheet. For example, using conditional formatting, you can highlight in yellow all cells that contain an error, and then work to fix them.

Conditional formatting in Microsoft Excel

To set up conditional formatting in Microsoft Excel to highlight all cells in a spreadsheet that contain errors, do the following:

1. Click the green triangle above row number 1 and to the left of Column A to select all cells in the spreadsheet.

2. From the main menu, click **Home**, and then click **Conditional Formatting** to select **Highlight Cell Rules > More Rules**.
3. For Select a Rule Type, choose **Use a formula to determine which cells to format**.
4. For Format values where this formula is true, enter **=ISERROR(A1)**.
5. Click the **Format** button, select the Fill tab, select yellow (or any other color), and then click **OK**.
6. Click **OK** to close the format rule window.

To remove conditional formatting, click Home and select Conditional Formatting, and then click Manage Rules. Locate the format rule in the list, click Delete Rule, and then click OK.

Conditional formatting in Google Sheets

To set up conditional formatting in Google Sheets to highlight all cells in a spreadsheet that contain errors, do the following:

1. Click the empty rectangle above row number 1 and to the left of Column A to select all cells in the spreadsheet. In the Step-by-step in spreadsheets video, this was called the Select All button.
2. From the main menu, click **Format** and select **Conditional Formatting** to open the Conditional format rules pane on the right.
3. While in the Single Color tab, under Format rules, use the drop-down to select **Custom formula is,** enter **=ISERROR(A1)**, select yellow (or any other color) for the formatting style, and then click **Done**.

To remove conditional formatting, click Format and select Conditional Formatting, and then click the Trash icon for the format rule.

Spreadsheet error resources

To learn more and read about additional examples of errors and solutions, explore these resources:

- **Microsoft Formulas and Functions:** This resource describes how to avoid broken formulas and how to correct errors in Microsoft Excel. This is a useful reference to have saved in case you run into a specific error and need to find solutions quickly while working in Excel.

- **When Your Formula Doesn't Work: Formula Parse Errors in Google Sheets**: This resource is a guide to finding and fixing some common errors in Google Sheets. If you are working with Google Sheets, you can use this as a quick reference for solving problems you might encounter working on your own.

With some practice and investigative determination, you will become much more comfortable handling errors in spreadsheets. Each error you catch and fix will make your data clearer, cleaner, and more useful.

Functions 101

Samstag, 5. Juli 2025 15:30

Function
L> preset command
L> automatically performs a specific process or task using data
L> imagine them as useful shortcuts
L> very similar to formulas
L> difference: formula is a set of instructions
L> difference: function is a preset command
L> e.g. SUM, MAX, MIN, AVERAGE

Auto-Filling
L> each clicked cell has a symbol in the bottom right corner
L> it can be used to paste functions into neighbouring cells

Relative, Absolute and Mixed References

- Relative references (cells referenced without a dollar sign, like **A2**) will change when you copy and paste the function into a different cell. With relative references, the location of the cell that contains the function determines the cells used by the function.
- Absolute references (cells fully referenced with a dollar sign, like **$A$2**) will not change when you copy and paste the function into a different cell. With absolute references, the cells referenced always remain the same.
- Mixed references (cells partially referenced with a dollar sign, like **$A2** or **A$2**) will change when you copy and paste the function into a different cell. With mixed references, the location of the cell that contains the function determines the cells used by the function, but only the row or column is relative (not both).
- In spreadsheets, you can press the **F4** key to toggle between relative, absolute, and mixed references in a function. Click the cell containing the function, highlight the referenced cells in the formula bar, and then press **F4** to toggle between and select relative, absolute, or mixed referencing.

=TEXT (XY, "mmmm")
L> can change a date into texts
L> number of m's to choose format

=COUNTIF('Raw Data'!G:G, A2)
L> 'XXX' describes another sheet
L> "!" is the space between sheet & cells
L> "A2" is what he should relate to count

Datei auswählen Keine ausgewählt

Keyboard Shortcuts [PDF]

Samstag, 5. Juli 2025 15:30

Command	Chromebook	PC	Mac
Create new workbook	Control+N	Control+N	Command+N
Open workbook	Control+O	Control+O	Command+O
Save workbook	Control+S	Control+S	Command+S
Close workbook	Control+W	Control+W	Command+W
Undo	Control+Z	Control+Z	Command+Z
Redo	Control+Y	Control+Y	Command+Y
Copy	Control+C	Control+C	Command+C
Cut	Control+X	Control+X	Command+X
Paste	Control+V	Control+V	Command+V
Paste values only	Control+Shift+V	Control+Shift+V	Command+Shift+V
Find	Control+Shift+F	Control+F	Command+F
Find and replace	Control+H	Control+H	Command+Shift+F
Insert link	Control+K	Control+K	Command+K
Bold	Control+B	Control+B	Command+B

Command	Chromebook	PC	Mac
Italicize	Control+I	Control+I	Command+I
Underline	Control+U	Control+U	Command+U
Zoom in	Control+Plus (+)	Control+Plus (+)	Option+Commad+Plus (+)
Zoom out	Control+Minus (-)	Control+Minus (-)	Option+Commad+Minus (-)
Select column	Control+Spacebar	Control+Spacebar	Command+Spacebar
Select row	Shift+Spacebar	Shift+Spacebar	Up Arrow+Spacebar
Select all cells	Control+A	Control+A	Command+A
Edit the current cell	Enter	F2	F2
Comment on a cell	Ctrl + Alt + M	Alt+I+M	Option+Command+M
Insert column to the left	Ctrl + Alt + = (with existing column selected)	Alt+Shift+I, then C	Command + Option + = (with existing column selected)
Insert column to the right	Alt + I, then O	Alt+Shift+I, then O	Ctrl+Option+I, then O
Insert row above	Ctrl + Alt + = (with existing row selected)	Alt+Shift+I, then R	Command + Option + = (with existing row selected)
Insert row below	Alt + I, then R, then B	Alt+Shift+I, then B	Ctrl + Option + I, then B

Datei auswählen Keine ausgewählt

Scope Of Work

Samstag, 5. Juli 2025 15:30

Scope Of Work (SoW)
L> some kind planning the work
L> everyone shares same understanding
L> everyone shares same goals
L> asking questions is essential
L> what is necessary information
L> where are the boundaries of asking
L> there is no *"standard"* for it
L> if sth changes, update SoW!
L> should not leave any level of confusion

Deliverables
L> what work is being done
L> what we want to deliver at the end
L> be specific - how much / how long

Milestones
L> related to timeline
L> how do you know what is complete?

Timeline
L> closely tied to milestones
L> mapping expectations
L> how long each step should take

Reports
L> set boundaries
L> when and how update stakeholders
L> how communicate progress
L> weekly, monthly, milestone-dependent

Datei auswählen Keine ausgewählt

SoW Sheet [PDF]

Samstag, 5. Juli 2025 15:30

Data Analysis Project

Data Analyst: (You) Patrick Witczak

Client/Sponsor: Yang Jing

Purpose:

Write a brief description of why this project is happening below. Why is this project happening? What are the goals?

Der Klient benutzt derzeit lediglich einen Kalender und ein vereinfachtes Spreadsheet zur zeitlichen Erfassung seiner Arbeit.
Das Ziel ist es aus der Historie Erkenntnisse über die Arbeit zu gewinnen, die geleistet wurde.
Bestenfalls soll das Maximum aus den Verfügbaren Ressourcen rausgeholt werden.

Scope / Major Project Activities:

What are the major parts of this project? List out the high-level steps, activities, or stages of the project, and give a brief description for each.

Activity	Description
Daten sammeln	Übertragung der rauen Daten von Google Kalender, Einbau einer Synchronisation mit Google Sheets
Daten reinigen	Filter von Daten, die keinen Bezug zur Arbeit haben. Sortierung der Daten in eine sinnvolle Ordnung.
Sinnvolle Metriken festlegen	Suche nach Metriken, die Erkenntnisse über die geschaffte Arbeit schaffen. Auswählen sinnvoller Illustrationen

This project does not include:

Specify the things that this project isn't responsible for doing (out of scope). For instance, "this project does not involve a summation of 2019 data analysis"

- Dieses Projekt wird vorerst keinerlei Gewinne oder Preis-/Leistungsverhältnisse widerspiegeln
- Es wird ggf. keine 100% Vollständigkeit besitzen, sondern eher eine starke Annäherung sein
- Es werden keine Daten über erfolgreiche/erfolglose Probestunden geben

Deliverables:

A specific list of things that your project will deliver.

Deliverable	Description/ Details
Übersicht aller Schüler	Anzahl, Stunden, Dauer
Geleistete Arbeitsstunden	Insgesamt, Monatlich, Wöchentlich, Durchschnitte
Monatsvergleiche	Schülerzahlen, Arbeitsstunden,
Probestunden	Anzahl pro Monat

Schedule Overview / Major Milestones:

The expected schedule for the project. This can be defined by milestones (e.g. "all data is cleaned and processed"), periods of time ("Week 1 / Week 2"), or other ways based on the needs of the project.

Milestone	Expected Completion Date	Description/Details
Daten übertragen	Tag 2	Synchronisierung mit Kalender
Daten gereinigt	Tag 5	Nicht-Arbeit-Termine gelöscht
Metriken ausgesucht	Tag 7	Mindestens 5
Visualisierung abgeschlossen	Tag 10	Mind. 3 Visualisierungen

***Estimated date for completion:**

This is my "if all goes well and I have everything I need, this is when I'll be done" date.

Mein Ziel wäre es nach dem Abschluss meines Zertifikates die Arbeit zu starten
Und bis zu meinem Semesterbeginn abzuschließen.
Start: 20. August 2025
Ende: 30. August 2025

Data Analysis Proje

Data Analyst: (You)

Client/Sponsor:
Citysville Department of Transportation

Purpose:

Write a brief description of why this project is happening below. W
are the goals?

The goal of this project is to study traffic congestion issues
Citysville. The project will identify the top 10 "hotspot" area
city using traffic sensor data. After identifying the top 10 a
causes of congestion in each area, and identify recommen
at each "hotspot". Each recommendation should include c
estimate of how much congestion each fix will reduce. The
recommend the 3 most cost-effective recommendations f
recommending the fixes that will do the most good for the

Scope / Major Project Activities:

What are the major parts of this project? List out the high-level ste
project, and give a brief description for each.

Activity	
Data Collection	Collect traffic Dept of Transp
Identify hotspots	Analyze DOT d hotspots for c
Identify congestion causes	Study each hot This stage may gathering using
Create congestion relief recommendations	Create recomn congestion hot recommendati congestion reli divided by cos
Deliver final report	Deliver final rep Department of

This project does not include:

Specify the things that this project isn't responsible for doing, For i
involve a summation of 2019 data analysis"

- Any areas outside the city limits of Citysville, as defined b
- Implementing any solutions or recommendations
- No traffic data older than 5 years will be considered in th

Deliverables:

A specific list of things that your project will deliver.

Deliverable	Descrip
Hotspot Map	A data visualization of the mos
Recommendations and Estimates	A list of recommendations for
Final Report	A final report detailing each of causes, recommendations for analysis for each hotspot.

Schedule Overview / Major Milestones:

The expected schedule for the project. This can be defined by mile
processed"), periods of time ("Week 1 / Week 2"), or other ways ba

Milestone	Expected Completion Date
Data Review	*1/1/21*
Data analysis	*1/15/21*
Hotspot List	*1/22/21*

Datei

Heatmap creation	*1//29/21*
Recommendations list	*2/28/21*

Final report	*3/31/21*

*Estimated date for completion:

This is my "if all goes well and I have everything I need, this is when

March 31, 2021

Context

Dienstag, 8. Juli 2025 11:49

Context can turn raw data into meaningful information

It is important to stay objective and be free from Biases

Questions that might help in finding context and staying objective:

Who:
The person or organization that created, collected, and/or funded the data collection

What:
The things in the world that data could have an impact on

Where:
The origin of the data

When:
The time when the data was created or collected

Why:
The motivation behind the creation or collection

How:
The method used to create or collect it

Datei auswählen Keine ausgewählt

Glossary

Samstag, 5. Juli 2025 15:30

Glossary terms from course 2, module 3

Terms and definitions for Course 2, Module 3

AVERAGE: A spreadsheet function that returns an average of the values from a selected range

Borders: Lines that can be added around two or more cells on a spreadsheet

Cell reference: A cell or a range of cells in a worksheet typically used in formulas and functions

COUNT: A spreadsheet function that counts the number of cells in a range that meet a specific criteria

Equation: A calculation that involves addition, subtraction, multiplication, or division (also called a math expression)

Fill handle: A box in the lower-right-hand corner of a selected spreadsheet cell that can be dragged through neighbouring cells in order to continue an instruction

Filtering: The process of showing only the data that meets a specified criteria while hiding the rest

Header: The first row in a spreadsheet that labels the type of data in each column

Math expression: A calculation that involves addition, subtraction, multiplication, or division (also called an equation)

Math function: A function that is used as part of a mathematical formula

MAX: A spreadsheet function that returns the largest numeric value from a range of cells

MIN: A spreadsheet function that returns the smallest numeric value from a range of cells

Open data: Data that is available to the public

Operator: A symbol that names the operation or calculation to be performed

Order of operations: Using parentheses to group together spreadsheet values in order to clarify the order in which operations should be performed

Problem domain: The area of analysis that encompasses every activity affecting or affected by a problem

Range: A collection of two or more cells in a spreadsheet

Report: A static collection of data periodically given to stakeholders

Return on investment (ROI): A formula that uses the metrics of investment and profit to evaluate the success of an investment

Revenue: The total amount of income generated by the sale of goods or services

Scope of work (SOW): An agreed-upon outline of the tasks to be performed during a project

Sorting: The process of arranging data into a meaningful order to make it easier to understand, analyse, and visualize

SUM: A spreadsheet function that adds the values of a selected range of cells

Datei auswählen Keine ausgewählt