SQL CHEAT SHEET http://www.sqltutorial.org

QUERYING DATA FROM A TABLE

SELECT c1, c2 FROM t;
Query data in columns c1, c2 from a table

SELECT * FROM t;
Query all rows and columns from a table

SELECT c1, c2 FROM t
WHERE condition;
Query data and filter rows with a condition

SELECT DISTINCT c1 FROM t
WHERE condition;
Query distinct rows from a table

SELECT c1, c2 FROM t
ORDER BY c1 ASC [DESC];
Sort the result set in ascending or descending order

SELECT c1, c2 FROM t
ORDER BY c1
LIMIT n OFFSET offset;
Skip *offset* of rows and return the next n rows

SELECT c1, aggregate(c2)
FROM t
GROUP BY c1;
Group rows using an aggregate function

SELECT c1, aggregate(c2)
FROM t
GROUP BY c1
HAVING condition;
Filter groups using HAVING clause

QUERYING FROM MULTIPLE TABLES

SELECT c1, c2
FROM t1
INNER JOIN t2 ON condition;
Inner join t1 and t2

SELECT c1, c2
FROM t1
LEFT JOIN t2 ON condition;
Left join t1 and t1

SELECT c1, c2
FROM t1
RIGHT JOIN t2 ON condition;
Right join t1 and t2

SELECT c1, c2
FROM t1
FULL OUTER JOIN t2 ON condition;
Perform full outer join

SELECT c1, c2
FROM t1
CROSS JOIN t2;
Produce a Cartesian product of rows in tables

SELECT c1, c2
FROM t1, t2;
Another way to perform cross join

SELECT c1, c2
FROM t1 A
INNER JOIN t2 B ON condition;
Join t1 to itself using INNER JOIN clause

USING SQL OPERATORS

SELECT c1, c2 FROM t1
UNION [ALL]
SELECT c1, c2 FROM t2;
Combine rows from two queries

SELECT c1, c2 FROM t1
INTERSECT
SELECT c1, c2 FROM t2;
Return the intersection of two queries

SELECT c1, c2 FROM t1
MINUS
SELECT c1, c2 FROM t2;
Subtract a result set from another result set

SELECT c1, c2 FROM t1
WHERE c1 [NOT] LIKE pattern;
Query rows using pattern matching %, _

SELECT c1, c2 FROM t
WHERE c1 [NOT] IN value_list;
Query rows in a list

SELECT c1, c2 FROM t
WHERE c1 BETWEEN low AND high;
Query rows between two values

SELECT c1, c2 FROM t
WHERE c1 IS [NOT] NULL;
Check if values in a table is NULL or not

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MANAGING TABLES

```
CREATE TABLE t (
    id INT PRIMARY KEY,
    name VARCHAR NOT NULL,
    price INT DEFAULT 0
);
```
Create a new table with three columns

```
DROP TABLE t ;
```
Delete the table from the database

```
ALTER TABLE t ADD column;
```
Add a new column to the table

```
ALTER TABLE t DROP COLUMN c ;
```
Drop column c from the table

```
ALTER TABLE t ADD constraint;
```
Add a constraint

```
ALTER TABLE t DROP constraint;
```
Drop a constraint

```
ALTER TABLE t1 RENAME TO t2;
```
Rename a table from t1 to t2

```
ALTER TABLE t1 RENAME c1 TO c2 ;
```
Rename column c1 to c2

```
TRUNCATE TABLE t;
```
Remove all data in a table

USING SQL CONSTRAINTS

```
CREATE TABLE t(
    c1 INT, c2 INT, c3 VARCHAR,
    PRIMARY KEY (c1,c2)
);
```
Set c1 and c2 as a primary key

```
CREATE TABLE t1(
    c1 INT PRIMARY KEY,
    c2 INT,
    FOREIGN KEY (c2) REFERENCES t2(c2)
);
```
Set c2 column as a foreign key

```
CREATE TABLE t(
    c1 INT, c1 INT,
    UNIQUE(c2,c3)
);
```
Make the values in c1 and c2 unique

```
CREATE TABLE t(
  c1 INT, c2 INT,
  CHECK(c1> 0 AND c1 >= c2)
);
```
Ensure c1 > 0 and values in c1 >= c2

```
CREATE TABLE t(
    c1 INT PRIMARY KEY,
    c2 VARCHAR NOT NULL
);
```
Set values in c2 column not NULL

MODIFYING DATA

```
INSERT INTO t(column_list)
VALUES(value_list);
```
Insert one row into a table

```
INSERT INTO t(column_list)
VALUES (value_list),
       (value_list), ....;
```
Insert multiple rows into a table

```
INSERT INTO t1(column_list)
SELECT column_list
FROM t2;
```
Insert rows from t2 into t1

```
UPDATE t
SET c1 = new_value;
```
Update new value in the column c1 for all rows

```
UPDATE t
SET c1 = new_value,
    c2 = new_value
WHERE condition;
```
Update values in the column c1, c2 that match the condition

```
DELETE FROM t;
```
Delete all data in a table

```
DELETE FROM t
WHERE condition;
```
Delete subset of rows in a table

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MANAGING VIEWS

CREATE VIEW v(c1,c2)
AS
SELECT c1, c2
FROM t;
Create a new view that consists of c1 and c2

CREATE VIEW v(c1,c2)
AS
SELECT c1, c2
FROM t;
WITH [CASCADED | LOCAL] CHECK OPTION;
Create a new view with check option

CREATE RECURSIVE VIEW v
AS
select-statement *-- anchor part*
UNION [ALL]
select-statement; *-- recursive part*
Create a recursive view

CREATE TEMPORARY VIEW v
AS
SELECT c1, c2
FROM t;
Create a temporary view

DROP VIEW view_name;
Delete a view

MANAGING INDEXES

CREATE INDEX idx_name
ON t(c1,c2);
Create an index on c1 and c2 of the table t

CREATE UNIQUE INDEX idx_name
ON t(c3,c4);
Create a unique index on c3, c4 of the table t

DROP INDEX idx_name;
Drop an index

SQL AGGREGATE FUNCTIONS

AVG returns the average of a list

COUNT returns the number of elements of a list

SUM returns the total of a list

MAX returns the maximum value in a list

MIN returns the minimum value in a list

MANAGING TRIGGERS

CREATE OR MODIFY TRIGGER trigger_name
WHEN EVENT
ON table_name TRIGGER_TYPE
EXECUTE stored_procedure;
Create or modify a trigger

WHEN
- **BEFORE** – invoke before the event occurs
- **AFTER** – invoke after the event occurs

EVENT
- **INSERT** – invoke for INSERT
- **UPDATE** – invoke for UPDATE
- **DELETE** – invoke for DELETE

TRIGGER_TYPE
- **FOR EACH ROW**
- **FOR EACH STATEMENT**

CREATE TRIGGER before_insert_person
BEFORE INSERT
ON person FOR EACH ROW
EXECUTE stored_procedure;
Create a trigger invoked before a new row is inserted into the person table

DROP TRIGGER trigger_name;
Delete a specific trigger
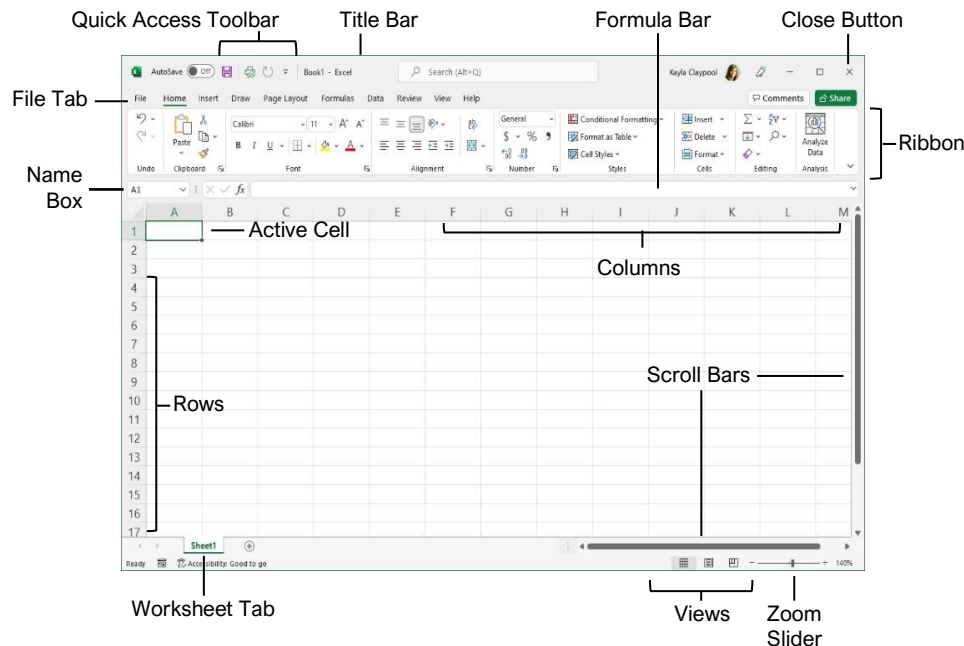
Microsoft®
Excel Cheat Sheet
Basic Skills

The Excel Program Screen

Quick Access Toolbar   Title Bar   Formula Bar   Close Button

File Tab

Name Box

Active Cell

Columns

Rows

Scroll Bars

Worksheet Tab

Views   Zoom Slider

Ribbon

Keyboard Shortcuts

General

Open a workbook	**Ctrl** + **O**
Create a new workbook	**Ctrl** + **N**
Save a workbook	**Ctrl** + **S**
Print a workbook	**Ctrl** + **P**
Close a workbook	**Ctrl** + **W**
Help	**F1**
Activate Tell Me field	**Alt** + **Q**
Spell check	**F7**
Calculate worksheets	**F9**
Create absolute reference	**F4**

Navigation

Move between cells	↑, ↓, ←, →
Right one cell	**Tab**
Left one cell	**Shift** + **Tab**
Down one cell	**Enter**
Up one cell	**Shift** + **Enter**
Down one screen	**Page Down**
To first cell of active row	**Home**
Enable End mode	**End**
To cell A1	**Ctrl** + **Home**
To last cell	**Ctrl** + **End**

Editing

Cut	**Ctrl** + **X**
Copy	**Ctrl** + **C**
Paste	**Ctrl** + **V**
Undo	**Ctrl** + **Z**
Redo	**Ctrl** + **Y**
Find	**Ctrl** + **F**
Replace	**Ctrl** + **H**
Edit active cell	**F2**
Clear cell contents	**Delete**

Formatting

Bold	**Ctrl** + **B**
Italics	**Ctrl** + **I**
Underline	**Ctrl** + **U**
Open Format Cells dialog box	**Ctrl** + **Shift** + **F**
Select All	**Ctrl** + **A**
Select entire row	**Shift** + **Space**
Select entire column	**Ctrl** + **Space**
Hide selected rows	**Ctrl** + **9**
Hide selected columns	**Ctrl** + **0**

Getting Started

Create a Workbook: Click the **File** tab and select **New** or press **Ctrl** + **N**. Double-click a workbook.

Open a Workbook: Click the **File** tab and select **Open** or press **Ctrl** + **O**. Select a recent file or navigate to the location where the file is saved.

Preview and Print a Workbook: Click the **File** tab and select **Print**.

Undo: Click the **Undo** ↺ button on the Quick Access Toolbar.

Redo or Repeat: Click the **Redo** ↻ button on the Quick Access Toolbar. The button turns to Repeat ↻ once everything has been re-done.

Use Zoom: Click and drag the zoom slider to the left or right.

Select a Cell: Click a cell or use the keyboard arrow keys to select it.

Select a Cell Range: Click and drag to select a range of cells. Or, press and hold down the **Shift** key while using the arrow keys to move the selection to the last cell of the range.

Select an Entire Worksheet: Click the **Select All** ◢ button where the column and row headings meet.

Select Non-Adjacent Cells: Click the first cell or cell range, hold down the **Ctrl** key, and select any non-adjacent cell or cell range.

Cell Address: Cells are referenced by the coordinates made from their column letter and row number, such as cell A1, B2, etc.

Jump to a Cell: Click in the **Name Box**, type the cell address you want to go to, and press **Enter**.

Change Views: Click a **View** button in the status bar. Or, click the **View** tab and select a view.

Recover an Unsaved Workbook: Restart Excel. If a workbook can be recovered, it will appear in the Document Recovery pane. Or, click the **File** tab, click **Recover unsaved workbooks** to open the pane, and select a workbook from the pane.

Edit a Workbook

Edit a Cell's Contents: Select a cell and click in the Formula Bar or double-click the cell. Edit the cell's contents and press **Enter**.

Clear a Cell's Contents: Select the cell(s) and press the **Delete** key. Or, click the **Clear** button on the Home tab and select **Clear Contents**.

Cut or Copy Data: Select cell(s) and click the **Cut** or **Copy** button on the Home tab.

Paste Data: Select the cell where you want to paste the data and click the **Paste** button in the Clipboard group on the Home tab.

Preview an Item Before Pasting: Place the insertion point where you want to paste, click the **Paste** button list arrow in the Clipboard group on the Home tab, and hold the mouse over a paste option to preview.

Paste Special: Select the destination cell(s), click the **Paste** button list arrow in the Clipboard group on the Home tab, and select **Paste Special**. Select an option and click **OK**.

Move or Copy Cells Using Drag and Drop: Select the cell(s) you want to move or copy, position the pointer over any border of the selected cell(s), then drag to the destination cells. To copy, hold down the **Ctrl** key before starting to drag.

Find and Replace Text: Click the **Find & Select** button, select **Replace**. Type the text you want to find in the Find what box. Type the replacement text in the Replace with box. Click the **Replace All** or **Replace** button.

Check Spelling: Click the **Review** tab and click the **Spelling** button. For each result, select a suggestion and click the **Change**/**Change All** button. Or, click the **Ignore**/**Ignore All** button.

Insert a Column or Row: Right-click to the right of the column or below the row you want to insert. Select **Insert** in the menu, or click the **Insert** button on the Home tab.

Delete a Column or Row: Select the row or column heading(s) you want to remove. Right-click and select **Delete** from the contextual menu, or click the **Delete** button in the Cells group on the Home tab.

Hide Rows or Columns: Select the rows or columns you want to hide, click the **Format** button on the Home tab, select **Hide & Unhide**, and select **Hide Rows** or **Hide Columns**.

Basic Formatting

Change Cell Alignment: Select the cell(s) you want to align and click a vertical alignment ≡, ≡, ≡ button or a horizontal alignment ≡, ≡, ≡ button in the Alignment group on the Home tab.

Format Text: Use the commands in the Font group on the Home tab or click the dialog box launcher in the Font group to open the dialog box.

Format Values: Use the commands in the Number group on the Home tab or click the dialog box launcher in the Number group to open the Format Cells dialog box.

Wrap Text in a Cell: Select the cell(s) that contain text you want to wrap and click the **Wrap Text** button on the Home tab.

Merge Cells: Select the cells you want to merge. Click the **Merge & Center** button list arrow on the Home tab and select a merge option.

Cell Borders and Shading: Select the cell(s) you want to format. Click the **Borders** button and/or the **Fill Color** button and select an option to apply to the selected cell.

Copy Formatting with the Format Painter: Select the cell(s) with the formatting you want to copy. Click the **Format Painter** button in the Clipboard group on the Home tab. Then, select the cell(s) you want to apply the copied formatting to.

Adjust Column Width or Row Height: Click and drag the right border of the column header or the bottom border of the row header. Double-click the border to AutoFit the column or row according to its contents.

Basic Formulas

Enter a Formula: Select the cell where you want to insert the formula. Type **=** and enter the formula using values, cell references, operators, and functions. Press **Enter**.

Insert a Function: Select the cell where you want to enter the function and click the **Insert Function** fx button next to the formula bar.

Reference a Cell in a Formula: Type the cell reference (for example, B5) in the formula or click the cell you want to reference.

SUM Function: Click the cell where you want to insert the total and click the **Sum** ∑ button in the Editing group on the Home tab. Enter the cells you want to total, and press **Enter**.

MIN and MAX Functions: Click the cell where you want to place a minimum or maximum value for a given range. Click the **Sum** ∑ button list arrow on the Home tab and select either **Min** or **Max**. Enter the cell range you want to reference, and press **Enter**.

COUNT Function: Click the cell where you want to place a count of the number of cells in a range that contain numbers. Click the **Sum** ∑ button list arrow on the Home tab and select **Count Numbers**. Enter the cell range you want to reference, and press **Enter**.

Insert Objects

Complete a Series Using AutoFill: Select the cells that define the pattern, i.e. a series of months or years. Click and drag the fill handle to adjacent blank cells to complete the series.

Insert an Image: Click the **Insert** tab on the ribbon, click either the **Pictures** or **Online Pictures** button in the Illustrations group, select the image you want to insert, and click **Insert**.

Insert a Shape: Click the **Insert** tab on the ribbon, click the **Shapes** button in the Illustrations group, and select the shape you wish to insert.

Hyperlink: Text or Images: Select the text or graphic you want to use as a hyperlink. Click the **Insert** tab, then click the **Link** button. Choose a type of hyperlink in the left pane of the Insert Hyperlink dialog box. Fill in the necessary informational fields in the right pane, then click **OK**.

Modify Object Properties and Alternative Text: Right-click an object. Select **Edit Alt Text** in the menu and make the necessary modifications under the Properties and Alt Text headings.

View and Manage Worksheets

Insert a New Worksheet: Click the **Insert Worksheet** button next to the sheet tabs below the active sheet. Or, press **Shift** + **F11**.

Delete a Worksheet: Right-click the sheet tab and select **Delete** from the menu.

Hide a Worksheet: Right-click the sheet tab and select **Hide** from the menu.

Rename a Worksheet: Double-click the sheet tab, enter a new name for the worksheet, and press **Enter**.

Change a Worksheet's Tab Color: Right-click the sheet tab, select **Tab Color**, and choose the color you want to apply.

Move or Copy a Worksheet: Click and drag a worksheet tab left or right to move it to a new location. Hold down the **Ctrl** key while clicking and dragging to copy the worksheet.

Switch Between Excel Windows: Click the **View** tab, click the **Switch Windows** button, and select the window you want to make active.

Freeze Panes: Activate the cell where you want to freeze the window, click the **View** tab on the ribbon, click the **Freeze Panes** button in the Window group, and select an option from the list.

Select a Print Area: Select the cell range you want to print, click the **Page Layout** tab on the ribbon, click the **Print Area** button, and select **Set Print Area**.

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Chart Elements

Chart Title

Chart Elements

Chart Styles

Chart Filters

Data Bar

Chart Area

Gridline

Axis Titles

Legend

Chart Options

Chart Types

Column: Used to compare different values vertically side-by-side. Each value is represented in the chart by a vertical bar.

Line: Used to illustrate trends over time (days, months, years). Each value is plotted as a point on the chart and values are connected by a line.

Pie: Useful for showing values as a percentage of a whole when all the values add up to 100%. The values for each item are represented by different colors.

Bar: Similar to column charts, except they display information in horizontal bars rather than in vertical columns.

Area: Similar to line charts, except the areas beneath the lines are filled with color.

XY (Scatter): Used to plot clusters of values using single points. Multiple items can be plotted by using different colored points or different point symbols.

Stock: Effective for reporting the fluctuation of stock prices, such as the high, low, and closing points for a certain day.

Surface: Useful for finding optimum combinations between two sets of data. Colors and patterns indicate values that are in the same range.

Charts

Create a Chart: Select the cell range that contains the data you want to chart. Click the **Insert** tab on the ribbon. Click a chart type button in the Charts group and select the chart you want to insert.

Move or Resize a Chart: Select the chart. Place the cursor over the chart's border and, with the 4-headed arrow ✛ showing, click and drag to move it. Or, click and drag a sizing handle ○ to resize it.

Change the Chart Type: Select the chart and click the **Design** tab. Click the **Change Chart Type** button and select a different chart.

Filter a Chart: With the chart you want to filter selected, click the **Filter** button next to it. Deselect the items you want to hide from the chart view and click the **Apply** button.

Position a Chart's Legend: Select the chart, click the **Chart Elements** button, click the **Legend** button, and select a position for the legend.

Show or Hide Chart Elements: Select the chart and click the **Chart Elements** button. Then, use the check boxes to show or hide each element.

Insert a Trendline: Select the chart where you want to add a trendline. Click the **Design** tab on the ribbon and click the **Add Chart Element** button. Select **Trendline** from the menu.

Charts

Insert a Sparkline: Select the cells you want to summarize. Click the **Insert** tab and select the sparkline you want to insert. In the Location Range field, enter the cell or cell range to place the sparkline and click **OK**.

Create a Dual Axis Chart: Select the cell range you want to chart, click the **Insert** tab, click the **Combo** button, and select a combo chart type.

Print and Distribute

Set the Page Size: Click the **Page Layout** tab. Click the **Size** button and select a page size.

Set the Print Area: Select the cell range you want to print. Click the **Page Layout** tab, click the **Print Area** button, and select **Set Print Area**.

Print Titles, Gridlines, and Headings: Click the **Page Layout** tab. Click the **Print Titles** button and set which items you wish to print.

Add a Header or Footer: Click the **Insert** tab and click the **Header & Footer** button. Complete the header and footer fields.

Adjust Margins and Orientation: Click the **Page Layout** tab. Click the **Margins** button to select from a list of common page margins. Click the **Orientation** button to choose Portrait or Landscape orientation.

Additional Chart Elements

Data Labels: Display values from the cells of the worksheet on the plot area of the chart.

Data Table: A table added next to the chart that shows the worksheet data the chart is illustrating.

Error Bars: Help you quickly identify standard deviations and error margins.

Trendline: Identifies the trend of the current data, not actual values. Can also identify forecasts for future data.

Intermediate Formulas

Absolute References: Absolute references always refer to the same cell, even if the formula is moved. In the formula bar, add dollar signs ($) to the reference you want to remain absolute (for example, **A1** makes the column and row remain constant).

Name a Cell or Range: Select the cell(s), click the Name box in the Formula bar, type a name for the cell or range, and press **Enter**. Names can be used in formulas instead of cell addresses, for example: **=B4*Rate**.

Reference Other Worksheets: To reference another worksheet in a formula, add an exclamation point '!' after the sheet name in the formula, for example: **=FebruarySales!B4**.

Reference Other Workbooks: To reference another workbook in a formula, add brackets '[ ]' around the file name in the formula, for example:
=[FebruarySales.xlsx]Sheet1!B4.

Order of Operations: When calculating a formula, Excel performs operations in the following order: Parentheses, Exponents, Multiplication and Division, and finally Addition and Subtraction (as they appear left to right). Use this mnemonic device to remember them:

Please	Parentheses
Excuse	Exponents
My	Multiplication
Dear	Division
Aunt	Addition
Sally	Subtraction

Concatenate Text: Use the CONCAT function **=CONCAT(text1,text2,…)** to join the text from multiple cells into a single cell. Use the arguments within the function to define the text you want to combine as well as any spaces or punctuation.

Payment Function: Use the PMT function **=PMT(rate,nper,pv,…)** to calculate a loan amount. Use the arguments within the function to define the loan rate, number of periods, and present value and Excel calculates the payment amount.

Date Functions: Date functions are used to add a specific date to a cell. Some common date functions in Excel include:

Date	=DATE(year,month,day)
Today	=TODAY()
Now	=NOW()

Display Worksheet Formulas: Click the **Formulas** tab on the ribbon and then click the **Show Formulas** button. Click the **Show Formulas** button again to turn off the formula view.

Manage Data

Export Data: Click the **File** tab. At the left, select **Export** and click **Change File Type**. Select the file type you want to export the data to and click **Save As**.

Import Data: Click the **Data** tab on the ribbon and click the **Get Data** button. Select the category and data type, and then the file you want to import. Click **Import**, verify the preview, and then click the **Load** button.

Use the Quick Analysis Tools: Select the cell range you want to summarize. Click the **Quick Analysis** button that appears. Select the analysis tool you want to use. Choose from formatting, charts, totals, tables, or sparklines.

Outline and Subtotal: Click the **Data** tab on the ribbon and click the **Subtotal** button. Use the dialog box to define which column you want to subtotal and the calculation you want to use. Click **OK**.

Use Flash Fill: Click in the cell to the right of the cell(s) where you want to extract or combine data. Start typing the data in the column. When a pattern is recognized, Excel predicts the remaining values for the column. Press **Enter** to accept the Flash Fill values.

Create a Data Validation Rule: Select the cells you want to validate. Click the **Data** tab and click the **Data Validation** button. Click the **Allow** list arrow and select the data you want to allow. Set additional validation criteria options and click **OK**.

Tables

Format a Cell Range as a Table: Select the cells you want to apply table formatting to. Click the **Format as Table** button in the Styles group of the Home tab and select a table format from the gallery.

	A	B	C	D
1	**Excursion**	**Jan**	**Feb**	**Mar**
2	Beijing	6,010	7,010	6,520
3	Las Vegas	35,250	28,125	37,455
4	México DF	20,850	17,200	27,010
5	Paris	33,710	29,175	35,840
6	Tokyo	12,510	14,750	11,490
7	**Total**	**108,330**	**96,260**	**118,315**

Sort Data: Select a cell in the column you want to sort. Click the **Sort & Filter** button on the Home tab. Select a sort order or select **Custom Sort** to define specific sort criteria.

Filter Data: Click the filter arrow for the column you want to filter. Uncheck the boxes for any data you want to hide. Click **OK**.

Add Table Rows or Columns: Select a cell in the row or column next to where you want to add blank cells. Click the **Insert** button list arrow on the Home tab. Select either **Insert Table Rows Above** or **Insert Table Columns to the Left**.

Tables

Remove Duplicate Values: Click any cell in the table and click the **Data** tab on the ribbon. Click the **Remove Duplicates** button. Select which columns you want to check for duplicates and click **OK**.

Insert a Slicer: With any cell in the table selected, click the **Design** tab on the ribbon. Click the **Insert Slicer** button. Select the columns you want to use as slicers and click **OK**.

Table Style Options: Click any cell in the table. Click the **Design** tab on the ribbon and select an option in the Table Style Options group.

Intermediate Formatting

Apply Conditional Formatting: Select the cells you want to format. On the **Home** tab, click the **Conditional Formatting** button. Select a conditional formatting category and then the rule you want to use. Specify the format to apply and click **OK**.

Apply Cell Styles: Select the cell(s) you want to format. On the Home tab, click the **Cell Styles** button and select a style from the menu. You can also select **New Cell Style** to define a custom style.

Apply a Workbook Theme: Click the **Page Layout** tab on the ribbon. Click the **Themes** button and select a theme from the menu.

Collaborate with Excel

Add a Cell Comment: Click the cell where you want to add a comment. Click the **Review** tab on the ribbon and click the **New Comment** button. Type your comment and then click outside of it to save the text.

Invite People to Collaborate: Click the **Share** button on the ribbon. Enter the email addresses of people you want to share the workbook with. Click the permissions button, select a permission level, and click **Apply**. Type a short message and click **Send**.

Co-author Workbooks: When another user opens the workbook, click the user's picture or initials on the ribbon, to see what they are editing. Cells being edited by others appear with a colored border or shading.

Protect a Worksheet: Before protecting a worksheet, you need to unlock any cells you want to remain editable after the protection is applied. Then, click the **Review** tab on the ribbon and click the **Protect Sheet** button. Select what you want to remain editable after the sheet is protected.

Add a Workbook Password: Click the **File** tab and select **Save As**. Click **Browse** to select a save location. Click the **Tools** button in the dialog box and select **General Options**. Set a password to open and/or modify the workbook. Click **OK**.

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PivotTable Elements

PivotTable Fields Pane

Active PivotTable | Search PivotTable Fields | Fields Pane Options

Tools Menu

Field List

PivotTable Field Areas

PivotTable Layout

PivotTable Fields Pane

The PivotTable Fields pane controls how data is represented in the PivotTable. Click anywhere in the PivotTable to activate the pane. It includes a Search field, a scrolling list of fields (these are the column headings in the data range used to create the PivotTable), and four areas in which fields are placed. These four areas include:

Filters: If a field is placed in the Filters area, a menu appears above the PivotTable. Each unique value from the field is an item in the menu, which can be used to filter PivotTable data.

Column Labels: The unique values for the fields placed in the Columns area appear as column headings along the top of the PivotTable.

Row Labels: The unique values for the fields placed in the Rows area appear as row headings along the left side of the PivotTable.

Values: The values are the "meat" of the PivotTable, or the actual data that's calculated for the fields placed in the rows and/or columns area. Values are most often numeric calculations.

Not all PivotTables will have a field in each area, and sometimes there will be multiple fields in a single area.

The Layout Group
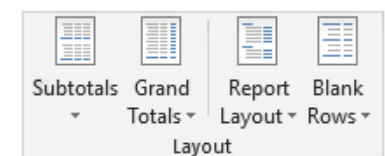
Subtotals: Show or hide subtotals and specify their location in the PivotTable.

Grand Totals: Add or remove grand total rows for columns and/or rows.

Report Layout: Adjust the report layout to show in compact, outline, or tabular form.

Blank Rows: Emphasize groups of data by manually adding blank rows between grouped items.

PivotTables

Create a PivotTable: Select the data range to be used by the PivotTable. Click the **Insert** tab on the ribbon and click the **PivotTable** button in the Tables group. Verify the range and then click **OK**.

Add Multiple PivotTable Fields: Click a field in the field list and drag it to one of the four PivotTable areas that contains one or more fields.

Filter PivotTables: Click and drag a field from the field list into the Filters area. Click the field's list arrow above the PivotTable and select the value(s) you want to filter.

Group PivotTable Values: Select a cell in the PivotTable that contains a value you want to group by. Click the **Analyze** tab on the ribbon and click the **Group Field** button. Specify how the PivotTable should be grouped and then click **OK**.

Refresh a PivotTable: With the PivotTable selected, click the **Analyze** tab on the ribbon. Click the **Refresh** button in the Data group.

Format a PivotTable: With the PivotTable selected, click the **Design** tab. Then, select desired formatting options from the PivotTable Options group and the PivotTable Styles group

PivotCharts

Create a PivotChart: Click any cell in a PivotTable and click the **Analyze** tab on the ribbon. Click the **PivotChart** button in the Tools group. Select a PivotChart type and click **OK**.

Modify PivotChart Data: Drag fields into and out of the field areas in the task pane.

Refresh a PivotChart: With the PivotChart selected, click the **Analyze** tab on the ribbon. Click the **Refresh** button in the Data group.

Modify PivotChart Elements: With the PivotChart selected, click the **Design** tab on the ribbon. Click the **Add Chart Element** button in the Chart Elements group and select the item(s) you want to add to the chart.

Apply a PivotChart Style: Select the PivotChart and click the **Design** tab on the ribbon. Select a style from the gallery in the Chart Styles group.

Update Chart Type: With the PivotChart selected, click the **Design** tab on the ribbon. Click the **Change Chart Type** button in the Type group. Select a new chart type and click **OK**.

Enable PivotChart Drill Down: Click the **Analyze** tab. Click the **Field Buttons** list arrow in the Show/Hide group and select **Show Expand/Collapse Entire Field Buttons**.

Macros

Enable the Developer Tab: Click the **File** tab and select **Options**. Select **Customize Ribbon** at the left. Check the **Developer** check box and click **OK**.

Record a Macro: Click the **Developer** tab on the ribbon and click the **Record Macro** button. Type a name and description then specify where to save it. Click **OK**. Complete the steps to be recorded. Click the **Stop Recording** button on the Developer tab.

Run a Macro: Click the **Developer** tab on the ribbon and click the **Macros** button. Select the macro and click **Run**.

Edit a Macro: Click the **Developer** tab on the ribbon and click the **Macros** button. Select a macro and click the **Edit** button. Make the necessary changes to the Visual Basic code and click the **Save** button.

Delete a Macro: Click the **Developer** tab on the ribbon and click the **Macros** button. Select a macro and click the **Delete** button.

Macro Security: Click the **Developer** tab on the ribbon and click the **Macro Security** button. Select a security level and click **OK.**

Troubleshoot Formulas

Common Formula Errors:

- **###### -** The column isn't wide enough to display all cell data.
- **#NAME? -** The text in the formula isn't recognized.
- **#VALUE! -** There is an error with one or more formula arguments.
- **#DIV/0 -** The formula is trying to divide a value by 0.
- **#REF! -** The formula references a cell that no longer exists.

Trace Precedents: Click the cell containing the value you want to trace and click the **Formulas** tab on the ribbon. Click the **Trace Precedents** button to see which cells affect the value in the selected cell.

Jan	Feb	Total
6,010	7,010	13,020

Error Checking: Select a cell containing an error. Click the **Formulas** tab on the ribbon and click the **Error Checking** button in the Formula Auditing group. Use the dialog to locate and fix the error.

The Watch Window: Select the cell you want to watch. Click the **Formulas** tab on the ribbon and click the **Watch Window** button. Click the **Add Watch** button. Ensure the correct cell is identified and click **Add**.

Evaluate a Formula: Select a cell with a formula. Click the **Formulas** tab on the ribbon and click the **Evaluate Formula** button.

Advanced Formatting

Customize Conditional Formatting: Click the **Conditional Formatting** button on the Home tab and select **New Rule**. Select a rule type, then edit the styles and values. Click **OK**.

Edit a Conditional Formatting Rule: Click the **Conditional Formatting** button on the Home tab and select **Manage Rules**. Select the rule you want to edit and click **Edit Rule**. Make your changes to the rule. Click **OK**.

Change the Order of Conditional Formatting Rules: Click the **Conditional Formatting** button on the Home tab and select **Manage Rules**. Select the rule you want to re-sequence. Click the **Move Up** or **Move Down** arrow until the rule is positioned correctly. Click **OK**.

Analyze Data

Goal Seek: Click the **Data** tab on the ribbon. Click the **What-If Analysis** button and select **Goal Seek**. Specify the desired value for the given cell and which cell can be changed to reach the desired result. Click **OK**.

Advanced Formulas

Nested Functions: A nested function is when one function is tucked inside another function as one of its arguments, like this:

$$\text{=IF(D2>AVERAGE(B2:B10),1,0)}$$

Initial Function | **Nested Function**

IF: Performs a logical test to return one value for a true result, and another for a false result.

$$\text{=IF(B2>69,"True","False")}$$

logical_test that can be evaluated as true or false | **value_if_true** value to return when the test is true | **value_if_false** value to return when the test is false

AND, OR, NOT: Often used with IF to support multiple conditions.

- **AND** requires multiple conditions.
- **OR** accepts several different conditions.
- **NOT** returns the opposite of the condition.

$$\text{=OR(B5="MN",B5="WI")}$$

logical1 the first condition to evaluate | **logical2** the second condition to evaluate

SUMIF and AVERAGEIF: Calculates cells that meet a condition.

- **SUMIF** finds the total.
- **AVERAGEIF** finds the average.

$$\text{=SUMIF(C6:C10,"MN",D6:D10)}$$

range of cells you want to apply criteria against | **criteria** used to determine what cells to sum or average | **calc_range** to calculate, if different than the range

Advanced Formulas

VLOOKUP: Looks for and retrieves data from a specific column in a table.

	A	B	C	D	E
1				**Agent Sales**	
2				5	7367
3					
4	**Agent ID**	**First**	**Last**	**Packages**	**Sales**
5	1	Joel	Nelson	6	6,602
6	2	Louis	Hay	7	8,246
7	3	Anton	Baril	11	13,683
8	4	Caroline	Jolie	12	14,108
9	5	Daniel	Ruiz	6	7,367

$$\text{=VLOOKUP(D2,A4:E10,5)}$$

value to look for in the first column of the table | **table** from which to retrieve a value | **col_index** the column number in the table from which to retrieve a value

HLOOKUP: Looks for and retrieves data from a specific row in a table.

$$\text{=HLOOKUP(B5,B2:I3,3)}$$

value to look for in the first row of the table | **table** from which to retrieve a value | **row_index** the row number in the table from which to retrieve a value

UPPER, LOWER, and PROPER: Changes how text is capitalized.

UPPER Case | **lower** case | **Proper** Case

$$\text{=UPPER(B4)}$$

text to change case or capitalization

LEFT and RIGHT: Extracts a given number of characters from the left or right.

$$\text{=LEFT(B5,3)}$$

text from which to extract characters | **num_chars** to extract from the left or right side of the text

MID: Extracts a given number of characters from the middle of text; the example below would return "day".

$$\text{=MID("Sunday",4,3)}$$

text from which to extract characters | **start_num** location of the first character to extract | **num_chars** the number of characters to extract

MATCH: Locates the position of a lookup value in a row or column.

$$\text{=MATCH("Dog",B2:B10)}$$

lookup_value to match in the lookup_array | **lookup_array** range of cells

INDEX: Returns a value or the reference to a value from within a range.

$$\text{=INDEX(A1:B5,2,2)}$$

array a range of cells | **row_num** the row position | **col_num** the column position (optional)

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Tableau Desktop Keyboard Shortcuts Cheat Sheet (V1 - 04/2020)

interworks

	DESCRIPTION	WINDOWS SHORTCUT	MAC SHORTCUT
Managing workbooks, sheets, and files	New workbook	Ctrl+N	Command+N
	New worksheet	Ctrl+M	Command+T
	Describe sheet	Ctrl+E	Command+E
	Cycle forward through open worksheets	Ctrl+Tab, Ctrl+F6	Shift+Command+right bracket
	Cycle backward through open worksheets	Ctrl+Shift+Tab, Ctrl+Shift+F6	Shift+Command+left bracket
	Switch in and out of Presentation Mode	F7 , Ctrl+H	Option+Return
	Switch in and out of Full Screen mode		Control+Command+F
	Open file	Ctrl+O	Command+O
	Save file	Ctrl+S	Command+S
	Save file as	Ctrl+Shift+S	
	Revert workbook to last saved state	F12	Option+Command+E
	Close the current workbook	Alt+F4	Command+W
	Print	Ctrl+P	Command+P
	Open Help	F1	Control+Command+question mark
Resizing rows and columns	Smaller cell size	Ctrl+B	Command+B
	Bigger cell size	Ctrl+Shift+B	Command+Shift+B
	Make rows narrower	Ctrl+left arrow	Control+Command+left arrow
	Make rows wider	Ctrl+right arrow	Control+Command+right arrow
	Make columns shorter	Ctrl+down arrow	Control+Command+down arrow
	Make columns taller	Ctrl+up arrow	Control+Command+up arrow
Selection Tools	Select all data	Ctrl+A	Command+A
	Copy selected data	Ctrl+C	Command+C
	Use Rectangular Selection tool	A	A
	Use Lasso Selection Tool	D	D
	Use Radial Selection Tool	S	S
	Clear the mark selection	Esc	Esc
Selecting and navigating marks	Select a mark	Click	Click
	Select a group of marks	Drag	Drag
	Add individual marks to the selection	Ctrl+click	Command+click
	Add a group of marks to the selection	Ctrl+drag	Command+drag
	Pan around the view	Shift+drag	Shift+drag
	Zoom in to a point in the view (if not map, requires zoom mode)	Double-click, Ctrl+Shift+click	Double-click, Shift+Command+click
	Zoom out from a point on a map (if not map, requires zoom mode)	Ctrl+Shift+Alt+click	Shift+Option+Command+click
	Zoom out	Shift+Double-click	Shift+Double+click
	Zoom in to an area in the view (requires zoom mode if not map)	Ctrl+Shift+drag	Shift+Command+drag
	Zoom in and out on a map	Scroll	Scroll
	Drag a row and scroll through a long list simultaneously	Click+drag to bottom of pane+hold	Click+scroll

	DESCRIPTION	WINDOWS SHORTCUT	MAC SHORTCUT
Authoring views	Show Me!	Ctrl+1 , Ctrl+Shift+1	Command+1
	Add the selected field to the sheet (Only works with a single field)	Enter or double-click	Return or double-click
	Place selected field on Columns shelf	Alt+Shift+C	Option+Shift+C
	Place selected field on Filters shelf	Alt+Shift+F	Option+Shift+F
	Place selected field on Size	Alt+Shift+I	Option+Shift+I
	Place selected field on Detail	Alt+Shift+L	Option+Shift+L
	Place selected field on Colour	Alt+Shift+O	Option+Shift+O
	Place selected field on Pages shelf	Alt+Shift+P	Option+Shift+P
	Place selected field on Rows shelf	Alt+Shift+R	Option+Shift+R
	Place selected field on Shape	Alt+Shift+S	Option+Shift+S
	Place selected field on Text/Label	Alt+Shift+T	Option+Shift+T
	Place selected field on Rows shelf	Alt+Shift+X	Option+Shift+X
	Place selected field on Columns shelf	Alt+Shift+Y	Option+Shift+Y
	Open the Drop Field menu	Right-click+drag to shelf	Option+drag to shelf
	Copy a field in the view and place it on another shelf or card	Ctrl+drag	Command+drag
	Swap rows and columns	Ctrl+W	Control+Command+W
	Flip orientation of column labels at bottom of view	Ctrl+L	
	Toggle dashboard grid on and off	G	G
	Toggle between Dashboard and Layout tabs	T	T
	Cut text selection (in captions, titles, formulas, etc.)	Ctrl+X	Command+X
	Paste clipboard	Ctrl+V	Command+V
	Undo	Ctrl+Z	Command+Z
	Redo	Ctrl+Y	Command+Shift+Z
	Clear the current worksheet	Alt+Shift+Backspace	Option+Shift+Delete
	Move floating dashboard object	Arrow key moves 1 px, Shift+arrow moves 10 px	Arrow key moves 1 px, Shift+arrow moves 10 px
	Resize floating dashboard object	Alt+arrow key resizes in 1-px increments, Shift+Alt+arrow resizes in 10-px increments	Option+arrow key resizes in 1-px increments, Shift+Alt+arrow resizes in 10-px increments
Pages	Start or stop forward playback on the Pages shelf	F4	F4
	Start or stop backward playback on the Pages shelf	Shift+F4	Shift+F4
	Skip forward one page	Ctrl+period	Command+period
	Skip backward one page	Ctrl+comma	Command+comma
Data	Connect to data source	Ctrl+D	Command+D
	Activate the find command in the Data pane	Ctrl+F	Command+F
	Refresh data source	F5	Command+R
	Run data updates on a view	F9	Shift+Command+0
	Toggle automatic data updates on and off	F10	Option+Command+0

by Raphael Teufel, *InterWorks*