📘 Comprehensive Excel Formulas Cheat Sheet

This document contains a structured reference of the **most commonly used and advanced Excel formulas**, organized by category, with **syntax, explanations, and examples**.

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1. Math & Trig

- `=SUM(A1:A10)` → Adds all numbers in range.
  Example: If A1:A5 = {2,3,5,7,10} → **27**
- `=ROUND(A1,2)` → Rounds value to 2 decimals.
  Example: 12.345 → **12.35**
- `=ROUNDUP(A1,0)` → Always rounds up.
- `=ROUNDDOWN(A1,0)` → Always rounds down.
- `=ABS(A1)` → Returns absolute value.
- `=MOD(A1,3)` → Returns remainder after division.
- `=POWER(A1,2)` → A1 squared.
- `=SUMPRODUCT(A1:A5,B1:B5)` → Multiplies corresponding items and sums.
  Example: A={2,3}, B={4,5} → 2×4 + 3×5 = **23**

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2. Statistical

- `=AVERAGE(A1:A10)` → Mean value.
- `=MEDIAN(A1:A10)` → Middle value.
- `=MODE(A1:A10)` → Most frequent value.
- `=STDEV.S(A1:A10)` → Sample standard deviation.
- `=VAR.S(A1:A10)` → Sample variance.
- `=RANK(A1,A1:A10,0)` → Rank of a number.
- `=CORREL(A1:A10,B1:B10)` → Correlation between 2 datasets.
- `=COUNTIF(A1:A10,">10")` → Count cells matching one condition.
- `=COUNTIFS(A1:A10,">10",B1:B10,"<5")` → Count cells matching multiple conditions.
- `=SUMIF(A1:A10,">10",B1:B10)` → Sum values in B where A > 10.
- `=SUMIFS(C1:C10,A1:A10,">10",B1:B10,"<5")` → Sum values in C with multiple conditions.

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3. Text Functions

- `=CONCAT(A1,B1)` → Joins values. *Example:* "Excel" + "Pro" → "ExcelPro".
- `=TEXT(A1,"MM/DD/YYYY")` → Format as date.
- `=LEFT(A1,4)` → First 4 chars.
- `=RIGHT(A1,3)` → Last 3 chars.

- `=LEN(A1)` → Character count.
- `=SEARCH("Pro",A1)` → Finds position of substring.
- `=SUBSTITUTE(A1,"old","new")` → Replace text.
- `=PROPER(A1)` → Capitalize words.

4. Logical

- `=IF(A1>50,"Pass","Fail")` → Conditional test.
- `=AND(A1>0,B1<100)` → Both must be TRUE.
- `=OR(A1>0,B1<100)` → At least one TRUE.
- `=NOT(A1>50)` → Reverses logic.
- `=IFS(A1>90,"A", A1>80,"B", TRUE,"C")` → Multiple IFs simplified.

5. Lookup & Reference

- `=VLOOKUP(40,A2:C10,2,FALSE)` → Searches first column.
- `=HLOOKUP(40,A1:J2,2,FALSE)` → Searches first row.
- `=INDEX(A1:C10,2,3)` → Returns value at row 2, col 3.
- `=MATCH(50,A1:A10,0)` → Position of 50 in list.
- `=XLOOKUP(40,A2:A10,B2:B10,"Not found")` → Modern replacement for VLOOKUP.
- `=INDEX(B1:B10,MATCH("Apple",A1:A10,0))` → INDEX + MATCH combo for flexible lookups.
- `=OFFSET(A1,2,3)` → Reference cell 2 down, 3 right.
- `=CHOOSE(2,"Red","Blue","Green")` → Returns 2nd item → "Blue".
- `=INDIRECT("A"&B1)` → Returns reference from text. If B1=5 → Returns A5.

6. Advanced Lookup & Analysis

- **Multi-Criteria Lookup (INDEX + MATCH + multiple conditions):**
  `=INDEX(C2:C10,MATCH(1,(A2:A10=E1)*(B2:B10=E2),0))`
  Returns value from column C where A=E1 and B=E2.

- **Dynamic Dependent Dropdowns with INDIRECT:**
  Use `=INDIRECT(A1)` in Data Validation so that choice in A1 determines dropdown list.

- **3D Formula Across Sheets:**
  `=SUM(Sheet1:Sheet3!A1)` → Sums A1 across Sheet1 to Sheet3.

- **Dynamic Ranges with OFFSET:**
  `=SUM(OFFSET(A1,0,0,B1,1))` → Sums a dynamic range based on value in B1.

- **Nested Lookups:**
  `=XLOOKUP(D1,A1:A10,XLOOKUP(D2,B1:B10,C1:C10))` → Double lookup.

- **Dynamic Named Ranges:**
  Using `=OFFSET($A$1,0,0,COUNTA($A:$A),1)` to auto-expand as data grows.

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7. Date & Time

- `=TODAY()` → Current date.
- `=NOW()` → Current date & time.
- `=DAY(A1)` → Extract day.
- `=MONTH(A1)` → Extract month.
- `=YEAR(A1)` → Extract year.
- `=EOMONTH(A1,1)` → End of next month.
- `=NETWORKDAYS(A1,A2)` → Business days between.
- `=DATEDIF(A1,A2,"Y")` → Years difference.
- `=WORKDAY(A1,5)` → Date after 5 workdays.

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8. Financial

- `=PMT(5%/12,60,30000)` → Monthly loan payment.
- `=FV(6%,10,-500)` → Future value of yearly $500 deposits.
- `=NPV(10%,A2:A10)` → Net present value.
- `=XNPV(10%,values,dates)` → NPV with irregular dates.
- `=XIRR(values,dates)` → IRR for irregular cashflows.
- `=IPMT(rate,period,nper,pv)` → Interest portion of payment.

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9. Dynamic Array Functions

- `=UNIQUE(A1:A20)` → Extract unique values.
- `=SORT(A1:A20,1,TRUE)` → Sort ascending.
- `=FILTER(A1:B20,B1:B20>100)` → Filter by condition.
- `=SEQUENCE(10,1,1,1)` → Generate sequence 1–10.
- `=RANDARRAY(5,1,1,100,TRUE)` → Random numbers 1–100.
- `=TEXTSPLIT(A1,",")` → Split text into columns.

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10. Information Functions

- `=ISNUMBER(A1)` → TRUE if number.

- `=ISTEXT(A1)` → TRUE if text.
- `=ISERROR(A1)` → TRUE if error.
- `=IFERROR(A1,"N/A")` → Replace error with text.
- `=TYPE(A1)` → Returns type of value.

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11. Database Functions

- `=DSUM(Database,"Sales",Criteria)` → Sum values meeting criteria.
- `=DAVERAGE(Database,"Cost",Criteria)` → Average meeting criteria.
- `=DCOUNT(Database,"ID",Criteria)` → Count entries.

Best Practices

- Use **named ranges** for readability.
- Prefer **XLOOKUP/INDEX-MATCH** over VLOOKUP.
- Use **dynamic arrays** instead of legacy arrays.
- Combine formulas with **conditional formatting** for dashboards.
- Apply **structured references** in tables for clarity.
- Use **INDIRECT & OFFSET carefully**—they are volatile and can slow down large workbooks.

✅This is a **comprehensive quick-reference** covering most Excel use cases (basic → advanced, including real-world lookup & analysis).