

Conditions and Formulas

Introduction to Excel Formulas

A formula in Microsoft Excel is an expression used to calculate values automatically.

Every formula in Excel begins with an equals sign:

=

Examples:

=10+20

=A1+B1

Benefits of Formulas:

- Saves time
- Reduces manual calculations
- Improves accuracy
- Handles large data easily
- Useful in schools, offices, banks, and businesses

Types of Excel Formulas

1. Mathematical Formulas
2. Statistical Formulas
3. Logical Formulas
4. Text Formulas
5. Date and Time Formulas
6. Lookup and Reference Formulas
7. Financial Formulas
8. Conditional Formulas
9. Database Formulas

10. Dynamic Array Formulas

PART 1 – BASIC MATHEMATICAL FORMULAS

Addition Formula

=A1+B1

Adds values.

Subtraction Formula

=A1-B1

Subtracts values.

Multiplication Formula

=A1*B1

Multiplies values.

Division Formula

=A1/B1

Divides values.

Percentage Formula

=(A1/B1)*100

Calculates percentage.

Power Formula

=A1^2

Calculates square or power.

PART 2 – COMMON FUNCTIONS

SUM Function

Adds numbers.

`=SUM(A1:A10)`

AVERAGE Function

Calculates average.

`=AVERAGE(A1:A10)`

MAX Function

Finds highest value.

`=MAX(A1:A10)`

MIN Function

Finds lowest value.

`=MIN(A1:A10)`

COUNT Function

Counts numeric cells.

`=COUNT(A1:A10)`

COUNTA Function

Counts non-empty cells.

```
=COUNTA(A1:A10)
```

COUNTBLANK Function

Counts empty cells.

```
=COUNTBLANK(A1:A10)
```

PART 3 – LOGICAL AND CONDITIONAL FORMULAS

Logical formulas are used to test conditions.

IF Function

Checks whether a condition is TRUE or FALSE.

Syntax:

```
=IF(condition, value_if_true, value_if_false)
```

Example:

```
=IF(A1>=35,"Pass","Fail")
```

Nested IF Function

Uses multiple conditions.

=IF(A1>=90,"A Grade",IF(A1>=75,"B Grade",IF(A1>=35,"Pass","Fail")))

AND Function

Returns TRUE if all conditions are true.

=AND(A1>50,B1>50)

OR Function

Returns TRUE if any condition is true.

=OR(A1>50,B1>50)

NOT Function

Reverses logic.

=NOT(A1>50)

IFERROR Function

Displays custom result instead of error.

=IFERROR(A1/B1,"Error")

IFS Function

Checks multiple conditions.

=IFS(A1>=90, "A", A1>=75, "B", A1>=35, "Pass", A1<35, "Fail")

SWITCH Function

Matches values.

=SWITCH(A1,1, "One", 2, "Two", 3, "Three")

PART 4 – COMPARISON CONDITIONS IN EXCEL

Condition	Meaning
=	Equal to
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to
<>	Not equal to

Examples:

=A1>50

=A1<=100

=A1<>0

PART 5 – TEXT FORMULAS

CONCAT Function

Combines text.

=CONCAT(A1,B1)

TEXTJOIN Function

Combines text with separator.

=TEXTJOIN(" ",TRUE,A1:C1)

LEFT Function

Extracts left-side characters.

=LEFT(A1,3)

RIGHT Function

Extracts right-side characters.

=RIGHT(A1,3)

MID Function

Extracts characters from middle.

=MID(A1,2,4)

LEN Function

Counts characters.

=LEN(A1)

UPPER Function

Converts text to uppercase.

=UPPER(A1)

LOWER Function

Converts text to lowercase.

=LOWER(A1)

PROPER Function

Capitalizes first letter.

=PROPER(A1)

TRIM Function

Removes extra spaces.

=TRIM(A1)

PART 6 – DATE AND TIME FORMULAS

TODAY Function

Displays current date.

=TODAY()

NOW Function

Displays current date and time.

=NOW()

DATE Function

Creates a date.

=DATE(2026,5,28)

DAY Function

Returns day.

=DAY(A1)

MONTH Function

Returns month.

=MONTH(A1)

YEAR Function

Returns year.

`=YEAR(A1)`

DATEDIF Function

Calculates difference between dates.

`=DATEDIF(A1, B1, "Y")`

PART 7 – LOOKUP AND REFERENCE FORMULAS

VLOOKUP Function

Searches vertically.

Syntax:

`=VLOOKUP(value, table, column, FALSE)`

Example:

`=VLOOKUP(101, A1:D10, 2, FALSE)`

HLOOKUP Function

Searches horizontally.

`=HLOOKUP(A1, B1:G5, 2, FALSE)`

XLOOKUP Function

Modern lookup function.

=XLOOKUP(A1,B1:B10,C1:C10)

INDEX Function

Returns value from position.

=INDEX(A1:A10,3)

MATCH Function

Finds position.

=MATCH("Ravi",A1:A10,0)

INDEX + MATCH

Advanced lookup.

=INDEX(B1:B10,MATCH("Ravi",A1:A10,0))

PART 8 – CONDITIONAL COUNTING AND SUMMING

COUNTIF Function

Counts based on condition.

=COUNTIF(A1:A10,">50")

COUNTIFS Function

Counts multiple conditions.

=COUNTIFS(A1:A10, ">50", B1:B10, "Pass")

SUMIF Function

Adds values based on condition.

=SUMIF(A1:A10, ">50", B1:B10)

SUMIFS Function

Adds values with multiple conditions.

=SUMIFS(C1:C10, A1:A10, ">50", B1:B10, "Pass")

PART 9 – FINANCIAL FORMULAS

PMT Function

Calculates loan payment.

=PMT(rate, nper, pv)

FV Function

Calculates future value.

=FV(rate, nper, pmt)

PV Function

Calculates present value.

=PV(rate,nper,pmt)

PART 10 – DATABASE FUNCTIONS

DSUM Function

Adds database values.

=DSUM(A1:D10,"Marks",F1:F2)

DCOUNT Function

Counts records.

=DCOUNT(A1:D10,"Marks",F1:F2)

DAVERAGE Function

Calculates average from database.

=DAVERAGE(A1:D10,"Marks",F1:F2)

PART 11 – DYNAMIC ARRAY FORMULAS

FILTER Function

Filters data.

=FILTER(A1:C10,B1:B10>50)

SORT Function

Sorts data automatically.

=SORT(A1:A10)

UNIQUE Function

Returns unique values.

=UNIQUE(A1:A10)

SEQUENCE Function

Generates number sequence.

=SEQUENCE(10)

PART 12 – COMMON EXCEL ERRORS

ERROR	MEANING
#DIV/0!	Division by zero
#NAME?	Incorrect formula name
#VALUE!	Wrong Data type
#REF!	Invalid cell reference
#N/A	Value not available
#NUM!	Invalid numeric value

PART 13 – FORMULA RULES

1. Every formula starts with =
2. Cell references can be used.

3. Parentheses control calculations.
4. Functions must be spelled correctly.
5. Use commas between arguments.

PART 14 – ABSOLUTE, RELATIVE, AND MIXED REFERENCES

Relative Reference

=A1+B1

Changes automatically when copied.

Absolute Reference

=\$A\$1

Does not change when copied.

Mixed Reference

=A\$1

or

=\$A1

PART 15 – ADVANTAGES OF USING FORMULAS

- Fast calculations
- Accurate results
- Automatic updates

- Easy data analysis
- Professional reporting
- Useful in all industries

Conclusion

Excel formulas and conditions are powerful tools used for calculations, data analysis, logical testing, reporting, and automation. Functions such as IF, SUM, COUNTIF, VLOOKUP, AVERAGE, MAX, MIN, and logical conditions help users work efficiently with large amounts of data. Learning formulas is one of the most important skills in Microsoft Excel for students, teachers, office workers, accountants, and business professionals.