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Introduction to Spreadsheet

A spreadsheet is a configuration of rows and columns used to record, calculate, and compare numerical or financial data. It is also known a

Spreadsheet applications like MS Excel allow users to enter and process data efficiently. Excel 2007 introduced a redesigned user interface

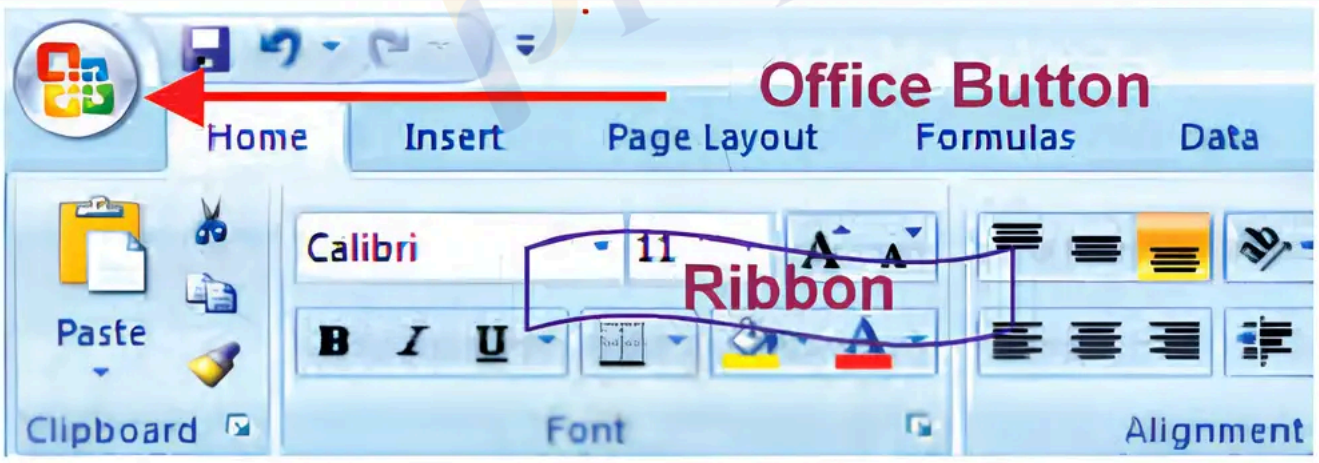


Figure 2.1

The Office Button provides access to file-related commands such as opening, saving, and printing documents. The Ribbon organizes comm

Key Definitions:

- **Workbook:** A file in Excel containing multiple worksheets.
- **Worksheet:** A single sheet within a workbook consisting of rows and columns.
- **Active Worksheet:** The worksheet currently selected for operations.
- **Cell:** Intersection of a row and a column, identified by a cell address (e.g., A1).
- **Cell Address:** Combination of column letter and row number identifying a cell.

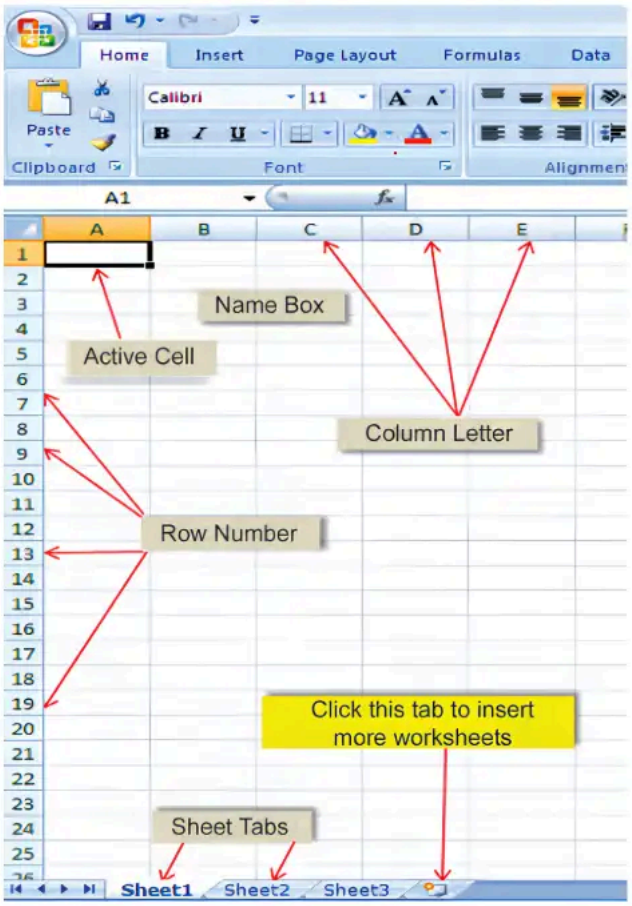


Figure 2.2

Users can navigate the worksheet using arrow keys or mouse, and cells can contain numeric, alphanumeric, or date data types.

Example: If quantity (Q) of an item is purchased at price (P), the value (V) is derived as V = Q × P, where Q and P are basic values and V i

Practice Set:

- Define workbook, worksheet, and cell with examples.
- Explain the difference between basic and derived values with examples.
- Identify parts of the Excel interface shown in the image.

Answer Key:

- A workbook is a file containing multiple worksheets.
- A worksheet is a single sheet with rows and columns.
- A cell is the intersection of a row and column, identified by a cell address like A1.
- Basic values are user-entered data; derived values are calculated using formulas.

Quick Reference: Workbook > Worksheets > Cells > Data Types (Numeric, Text, Date)

Glossary: Workbook, Worksheet, Cell, Cell Address, Formula, Function

Basic Concepts of Spreadsheet

Excel files are called workbooks, which contain multiple worksheets. By default, three worksheets are available, and users can add or renar

Rows are numbered from 1 to 65,536 and columns are labeled from A to IV (256 columns), providing a large grid of cells for data entry.

Each cell can contain a value, formula, or function. Cell references identify the location of cells and can be relative, absolute, or mixed refe

Cell Reference Types:

- **Relative Reference:** Changes when copied to another cell (e.g., A1).
- **Absolute Reference:** Fixed reference using $ signs (e.g., A1).
- **Mixed Reference:** Either row or column fixed (e.g., $A1 or A$1).

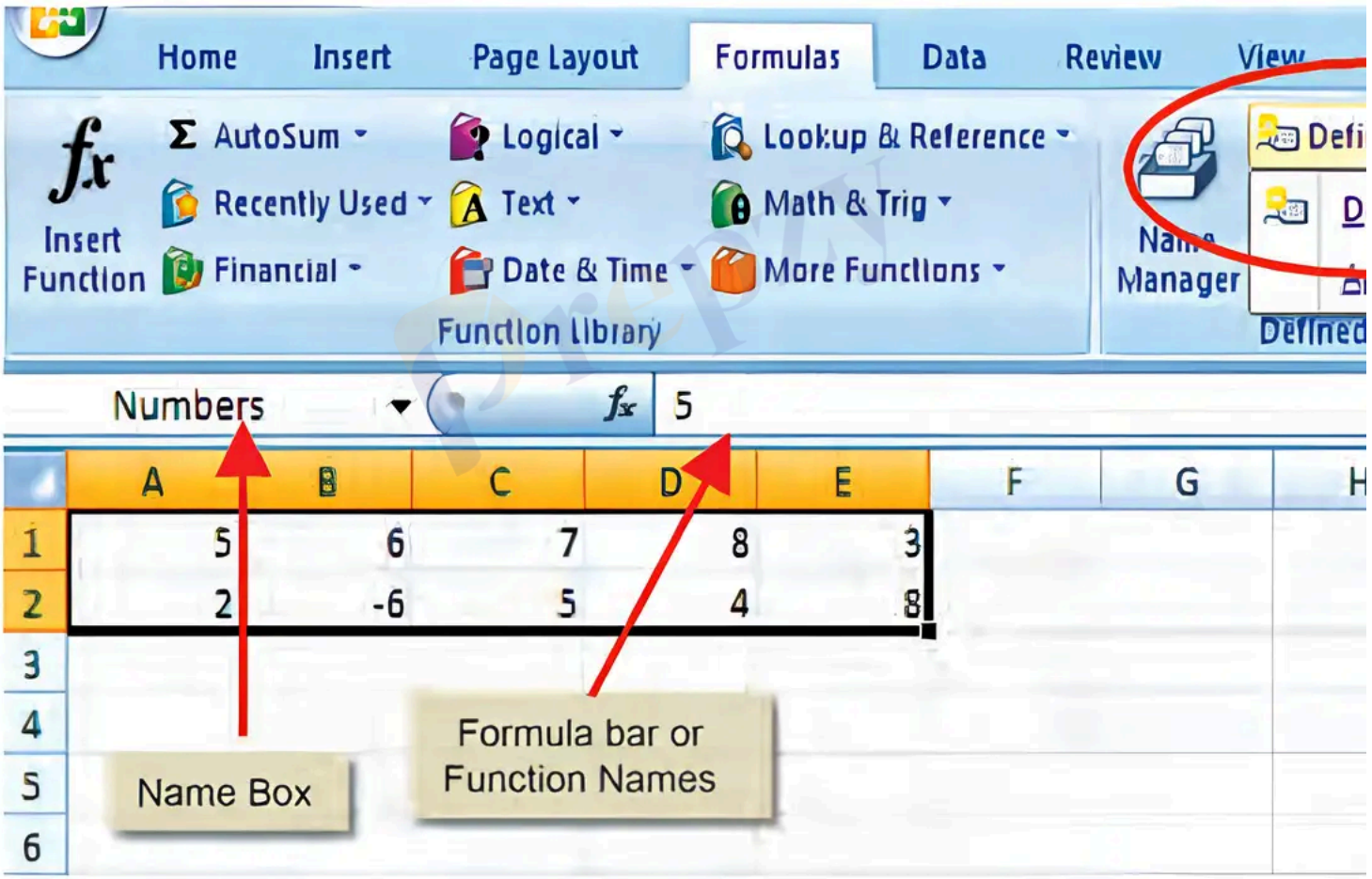


Figure 2.3

Keyboard shortcuts and mouse operations help navigate and operate within the worksheet efficiently.

Practice Set:

- Explain the difference between relative, absolute, and mixed cell references with examples.
- List keyboard shortcuts for moving around the worksheet.
- Describe the structure of rows and columns in Excel 2007.

Answer Key:

- Relative references adjust when copied; absolute references remain fixed; mixed references fix either row or column.
- Arrow keys move one cell; Ctrl+Home moves to A1; Ctrl+End moves to last cell with data.
- Excel 2007 has 65,536 rows and 256 columns labeled A to IV.

Quick Reference: Cell References: Relative, Absolute, Mixed; Rows: 1-65536; Columns: A-IV

Glossary: Cell Reference, Relative Reference, Absolute Reference, Mixed Reference

Formulas and Functions

A formula is a mathematical calculation entered in a cell, starting with an equal sign (=). It can include cell references, arithmetic operators

Functions are predefined formulas that perform specific calculations, such as SUM(), AVERAGE(), and COUNT(). Functions take arguments, w

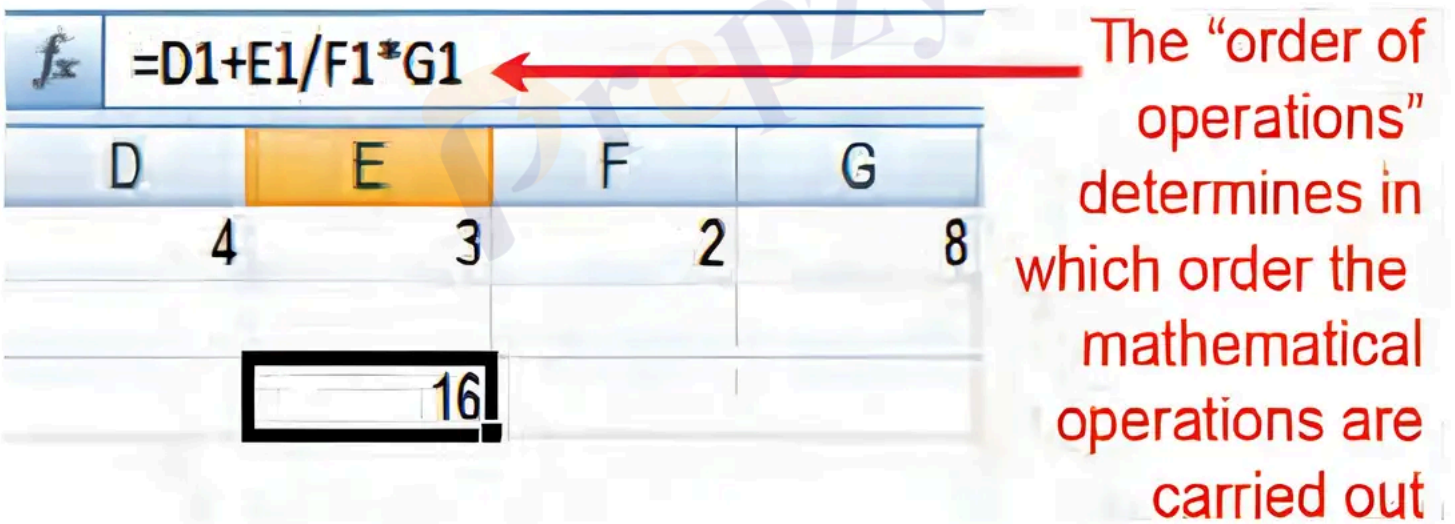


Figure 2.7

Excel follows the order of operations (PEMDAS/GEMS) when evaluating formulas: parentheses, exponents, multiplication/division, addition/s

Common Functions:

- **SUM(range):** Adds all numbers in the range.
- **AVERAGE(range):** Calculates the mean of numbers in the range.
- **COUNT(range):** Counts numeric entries in the range.

Practice Set:

- Write a formula to calculate the total of cells B1 to B5.
- Explain the difference between a formula and a function.
- Calculate the result of =D1+E1/F1*G1 given D1=4, E1=3, F1=2, G1=8.

Answer Key:

- =SUM(B1:B5) adds values in cells B1 to B5.
- A formula is a user-defined calculation; a function is a predefined formula.
- Result is 16 (3/2=1.5, 1.5*8=12, 4+12=16).

Quick Reference: Formulas start with =; Functions like SUM(), AVERAGE(), COUNT()

Glossary: Formula, Function, Argument, Order of Operations

Naming Ranges and Conditional Functions

Naming ranges allows assigning a descriptive name to a cell range, making formulas easier to read and manage.

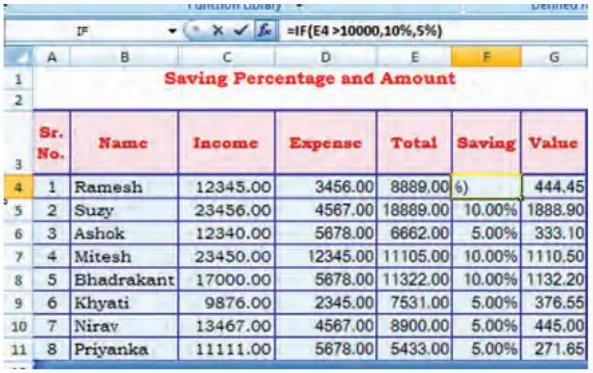
Example: Naming cells B1:F1 as "Numbers" allows using =SUM(Numbers) instead of =SUM(B1:F1).

Conditional functions like IF() return values based on logical tests.

IF Function Syntax: IF(logical_test, value_if_true, value_if_false)

Example: =IF(A1<20, "Yes", "No") returns "Yes" if A1 is less than 20, otherwise "No".

Nested IF functions allow multiple conditions to be tested sequentially.



Sr. No.	Name	Income	Expense	Total	Saving	Value
1	Ramesh	12345.00	3456.00	8889.00	%)	444.45
2	Suzy	23456.00	4567.00	18889.00	10.00%	1888.90
3	Ashok	12340.00	5678.00	6662.00	5.00%	333.10
4	Mitesh	23450.00	12345.00	11105.00	10.00%	1110.50
5	Bhadrakant	17000.00	5678.00	11322.00	10.00%	1132.20
6	Khyati	9876.00	2345.00	7531.00	5.00%	376.55
7	Nirav	13467.00	4567.00	8900.00	5.00%	445.00
8	Priyanka	11111.00	5678.00	5433.00	5.00%	271.65

Figure 2.12(a)

Practice Set:

- Create a named range and use it in a SUM formula.
- Write an IF function to check if a value is greater than 100.
- Explain nested IF with an example.

Answer Key:

- Named range "Numbers" for B1:F1; formula =SUM(Numbers) sums the range.
- IF(A1>100, "High", "Low") returns "High" if A1>100, else "Low".
- Nested IF checks multiple conditions, e.g., =IF(E2<55, "Fail", IF(E2<91, "C Grade", "B Grade"))

Quick Reference: Named Ranges, IF(), Nested IF()

Glossary: Named Range, IF Function, Logical Test, Nested IF

Useful Functions in Business Applications

Excel provides various categories of functions useful in business, including Date & Time, Mathematical, Text Manipulation, Logical, Lookup &

Date and Time Functions:

- **TODAY():** Returns current date.
- **NOW():** Returns current date and time.
- **DAY(), MONTH(), YEAR():** Extract day, month, year from a date.
- **DATEVALUE():** Converts date text to serial number.

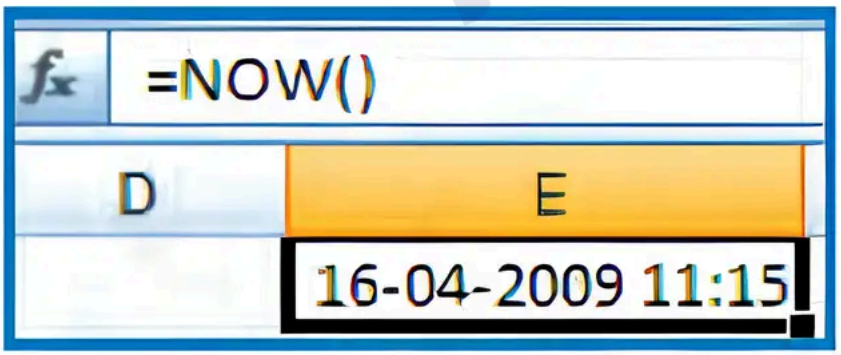


Figure 2.15

Mathematical Functions:

- **SUMIF(range, criteria, sum_range):** Adds cells meeting criteria.
- **ROUND(number, num_digits):** Rounds number to specified digits.
- **ROUNDUP(), ROUNDDOWN():** Round numbers up or down.
- **COUNT(), COUNTA(), COUNTBLANK(), COUNTIF():** Count cells based on conditions.

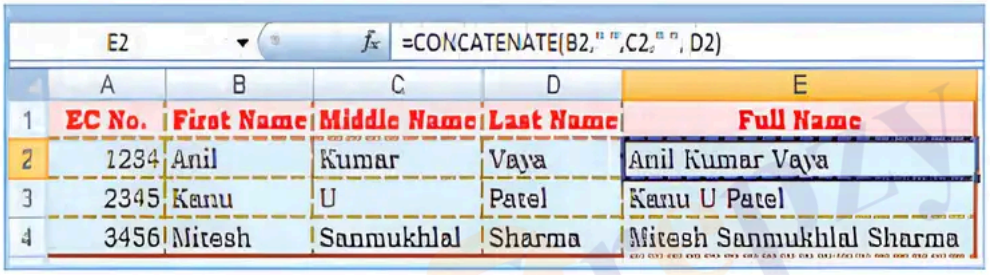
=SUMIF(D2:E5,">150000",E2:E5)

	C	D	E
		Asset Value	Depriciation
		100,000	7,000
		200,000	14,000
		300,000	21,000
		400,000	28,000
	Total	1,000,000	70,000
	Using SUMIF		63000

Figure 2.18

Text Manipulation Functions:

- **TEXT(value, format_text):** Converts number to formatted text.
- **CONCATENATE(text1, text2,...):** Joins multiple text strings.



	A	B	C	D	E
1	EC No.	First Name	Middle Name	Last Name	Full Name
2	1234	Anil	Kumar	Vaya	Anil Kumar Vaya
3	2345	Kanu	U	Patel	Kanu U Patel
4	3456	Mitesh	Sanmukhlal	Sharma	Mitesh Sanmukhlal Sharma

Figure 2.22(b)

Logical Functions:

- **AND(logical1, logical2,...):** Returns TRUE if all arguments are TRUE.
- **OR(logical1, logical2,...):** Returns TRUE if any argument is TRUE.

Lookup and Reference Functions:

LOOKUP: Returns a value from a vector or array based on a lookup value.

VLOOKUP: Searches vertically in a table and returns a value from a specified column.

HLOOKUP: Searches horizontally in a table and returns a value from a specified row.

	A	B
1	Frequency	Colour
2	4.14	red
3	4.19	orange
4	5.17	yellow
5	5.77	green
6	6.39	blue

Figure 2.23

Financial Functions:

- **ACCRINT:** Calculates accrued interest for securities.
- **CUMIPMT:** Returns cumulative interest paid between periods.
- **PV:** Calculates present value of an investment.
- **FV:** Calculates future value of an investment.
- **PMT:** Calculates periodic payment for an annuity.
- **RATE:** Returns interest rate per period.
- **NPV:** Calculates net present value of an investment.

	A	B	C
1	Data	Description	
2	9%	Annual interest rate	
3	30	Years of the loan	
4	125,000	Present value	
5	Result	Description	Formula
6	-11135.23	Total interest paid in the second year of payments. periods 13 through 24	=CUMIPMT(A2/12,A3 12,A4,13,24,0)
7	-937.5	Interest paid in a single payment in the first month	=CUMIPMT(A2/12,A3 12,A4,1,1,0)

Figure 2.28

Practice Set:

- Use TODAY() and NOW() functions to display current date and time.
- Calculate sum of values greater than a specified amount using SUMIF.
- Use VLOOKUP to find employee salary from a table.

- Calculate loan payment using PMT function.

Answer Key:

- TODAY() returns current date; NOW() returns current date and time.
- SUMIF(D2:D5, ">150000", E2:E5) sums depreciation for assets valued over 150,000.
- VLOOKUP(employee_code, table_range, column_index, FALSE) returns exact salary.
- PMT(rate, nper, pv) calculates monthly loan payment.

Quick Reference: Date & Time, Math, Logical, Lookup, Financial Functions

Glossary: TODAY, NOW, SUMIF, VLOOKUP, PMT, NPV

Data Entry, Text Management and Cell Formatting

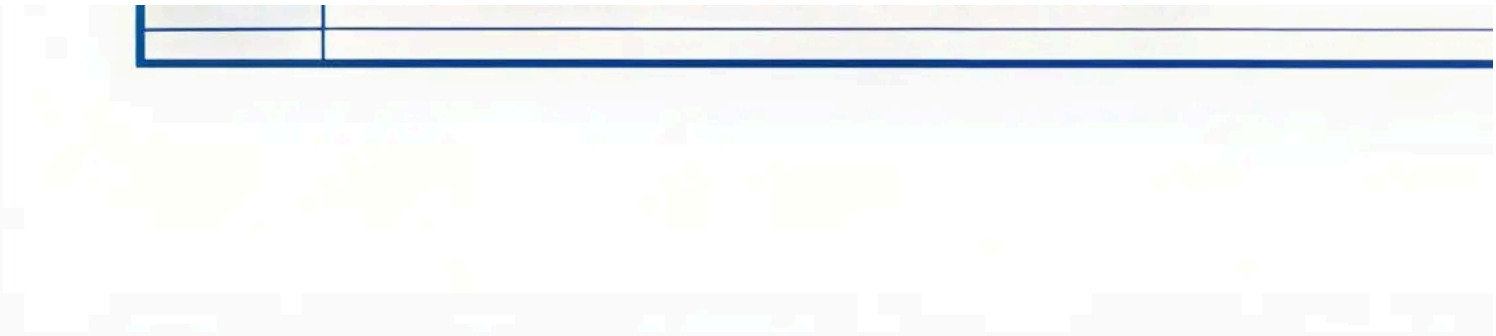
Data entry in spreadsheets requires accuracy and proper formatting. Excel distinguishes data types such as numeric, text, date, and formu

Excel provides features like data fill options, copy-paste, and keyboard shortcuts to facilitate fast and accurate data entry.

Data Validation: Ensures data entered meets specified criteria, preventing errors and maintaining consistency.

Methods include creating drop-down lists, setting limits on values, and using formulas for custom validation.


Home
Insert
From Access
From Web
From Text
From Other Sources
DEPT
A
1 Employee Name
2 MITESH SHAH
5 ALOK VYAS
4 PRANAV DAVE
5 RAJENDRA TRIVEDI
6 RENU TRIVEDI
7 CHHAYA DAVE
8 BALKRISHNA THAKK
9 PRABODH VYAS
10 NEETA THAKUR



Input messages and error alerts guide users during data entry, improving data quality.

Practice Set:

- Create a drop-down list for department names using data validation.
- Set data validation to restrict age between 18 and 58.
- Use a formula to prevent duplicate entries in a range.

Answer Key:

- Use Data Validation List with named range for departments.
- Set Whole Number validation with minimum 18 and maximum 58 for age.
- Use custom formula with COUNTIF to prevent duplicates.

Quick Reference: Data Validation, Drop-down List, Input Message, Error Alert

Glossary: Data Validation, Drop-down List, Input Message, Error Alert

Data Formatting and Printing

Formatting enhances readability and presentation of spreadsheet data. Excel offers number formatting (currency, percentage, date), text f

Conditional formatting highlights cells based on criteria, using color scales, data bars, and icon sets to visualize data trends and exceptions

	A	B	C	D	E	F	G	H
1	Sales for Home AppliancesYear 2008_09							
2	(Figures in 000's)							
3		Q1	Q2	Q3	Q4	Actual	Target	In %
4	ALOK	40	57	52	65	214	250	0.856
5	PRANAV	50	69	69	90	278	220	1.2636
6	PRABODH	53	75	71	82	281	250	1.124
7	RAJENDRA	44	59	38	70	211	200	1.055
8	Total					984	920	1.0696
9	Reported on							
10	16-04-2009							

Figure 2.52(a)

Printing options include setting print areas, printing selected ranges, multiple ranges, and printing entire worksheets or workbooks.

Headers and footers can be added for descriptive information on printed pages.

Practice Set:

- Format a range of cells as currency with zero decimal places.
- Apply conditional formatting to highlight sales above a target.
- Set print area for a specific range and print selected cells.

Answer Key:

- Use Format Cells dialog to set currency format with zero decimals.
- Use Conditional Formatting > Highlight Cells Rules > Greater Than.
- Set print area via Page Layout > Print Area > Set Print Area.

Quick Reference: Number Formatting, Conditional Formatting, Print Area

Glossary: Number Format, Conditional Formatting, Print Area, Header, Footer

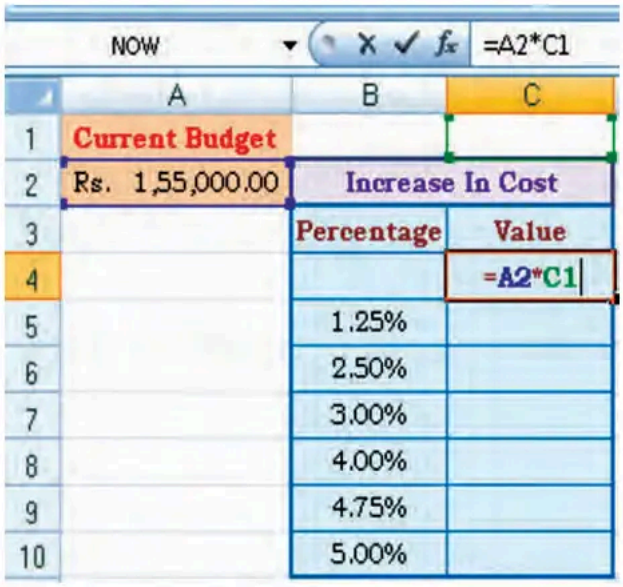
Preparation of Reports Using Pivot Table

Pivot Tables provide interactive summary reports from large data sets, allowing users to analyze data by rearranging fields, filtering, and gr

Types of data tables include one-variable and two-variable data tables used for what-if analysis.

One-variable data table: Uses one input cell to calculate results for different values.

Two-variable data table: Uses two input cells to generate a matrix of results.

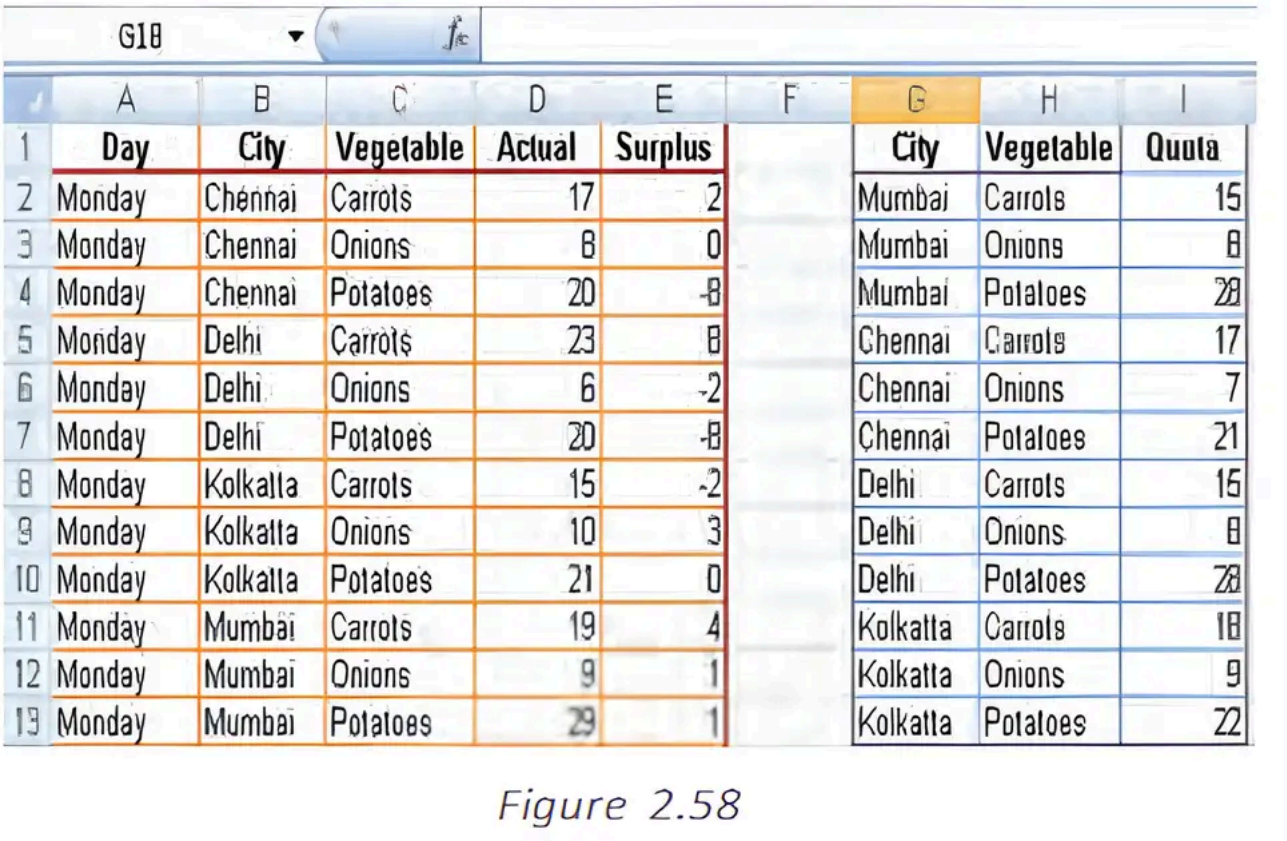


NOW =A2*C1

	A	B	C
1	Current Budget		
2	Rs. 1,55,000.00	Increase In Cost	
3		Percentage	Value
4			=A2*C1
5		1.25%	
6		2.50%	
7		3.00%	
8		4.00%	
9		4.75%	
10		5.00%	

Figure 2.56

Pivot Tables allow grouping, sorting, and summarizing data with drag-and-drop fields.



G18

	A	B	C	D	E	F	G	H	I
1	Day	City	Vegetable	Actual	Surplus		City	Vegetable	Quota
2	Monday	Chennai	Carrots	17	2		Mumbai	Carrots	15
3	Monday	Chennai	Onions	8	0		Mumbai	Onions	8
4	Monday	Chennai	Potatoes	20	-8		Mumbai	Potatoes	28
5	Monday	Delhi	Carrots	23	8		Chennai	Carrots	17
6	Monday	Delhi	Onions	6	-2		Chennai	Onions	7
7	Monday	Delhi	Potatoes	20	-8		Chennai	Potatoes	21
8	Monday	Kolkatta	Carrots	15	-2		Delhi	Carrots	15
9	Monday	Kolkatta	Onions	10	3		Delhi	Onions	8
10	Monday	Kolkatta	Potatoes	21	0		Delhi	Potatoes	28
11	Monday	Mumbai	Carrots	19	4		Kolkatta	Carrots	18
12	Monday	Mumbai	Onions	9	1		Kolkatta	Onions	9
13	Monday	Mumbai	Potatoes	29	1		Kolkatta	Potatoes	22

Figure 2.58

Advantages:

- Quick summarization of large data.
- Interactive data analysis with filtering and grouping.
- Flexible layout changes (pivoting rows and columns).
- Improved readability and presentation.

Practice Set:

- Create a one-variable data table for budget increase calculations.
- Create a two-variable multiplication table.
- Build a Pivot Table report from given sales data.

Answer Key:

- One-variable data table uses formula linked to one input cell and a list of values.
- Two-variable data table uses formula linked to two input cells and two lists of values.
- Pivot Table created by selecting data range, inserting Pivot Table, and arranging fields.

Quick Reference: Pivot Table, One-variable Data Table, Two-variable Data Table

Glossary: Pivot Table, Data Table, What-if Analysis

Common Errors (Messages) in Spreadsheet

Excel displays error messages when formulas cannot be evaluated correctly. Common errors include:

- **#####:** Column not wide enough or negative date/time.
- **#DIV/0!:** Division by zero.
- **#N/A:** Value not available for lookup.
- **#NAME?:** Unrecognized text in formula.
- **#NULL!:** Incorrect range intersection.
- **#NUM!:** Invalid numeric values or iteration errors.
- **#REF!:** Invalid cell reference.
- **#VALUE!:** Wrong type of argument or operand.

Excel provides tools for error checking and correction, including tracing precedents and dependents, and using IF functions to handle errors

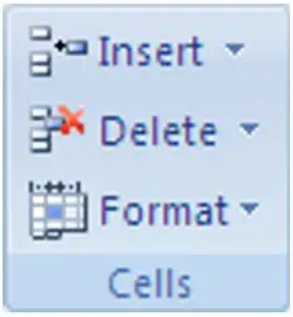


Figure 2.59

Practice Set:

- Identify causes and solutions for #DIV/0! and #N/A errors.
- Explain how to fix #REF! and #VALUE! errors.
- Use IF function to prevent error display in formulas.

Answer Key:

- #DIV/0! occurs when dividing by zero; fix by checking divisor.
- #N/A occurs when lookup value is missing; fix by correcting lookup range.
- #REF! occurs due to invalid cell references; fix by correcting or restoring cells.
- #VALUE! occurs due to wrong argument types; fix by ensuring correct data types.
- Use IF to check conditions and avoid errors, e.g., =IF(B5=0,"",A5/B5).

Quick Reference: Error Types, Causes, Solutions

Glossary: #DIV/0!, #N/A, #REF!, #VALUE!, Error Checking

Summary

• A spreadsheet consists of rows and columns forming cells where data or formulas can be entered.

• Workbooks contain multiple worksheets; each worksheet has cells identified by column letters and row numbers.

• Formulas and functions perform calculations; functions like SUM, IF, VLOOKUP simplify data processing.

• Naming ranges and using conditional functions improve formula readability and decision-making.

• Excel provides various functions for date/time, math, text, logical, lookup, and financial calculations.

• Data entry requires accuracy and validation to maintain data integrity.

• Formatting tools enhance readability and presentation of data.

• Pivot Tables allow interactive data summarization and analysis.

• Common errors have specific causes and solutions; Excel offers tools to identify and correct them.