

# 1. Excel / Google Sheets

Used for quick exploration, cleaning, and simple analysis.

## Key Functions:

- **IF**

```
=IF(A2>1000, "High", "Low")
```

→ If sales > 1000, mark as "High", else "Low".

- **VLOOKUP (or XLOOKUP)**

```
=VLOOKUP(101, A2:C100, 2, FALSE)
```

→ Search for ID 101 in first column, return corresponding value in column 2.

- **SUMIFS**

```
=SUMIFS(C2:C100, B2:B100, "North")
```

→ Sum of column C (sales) where region = North.

- **Pivot Table**

Summarize data (e.g., average sales by region). Drag-and-drop, no code needed.

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## 2. SQL

The main tool for extracting & transforming data from databases.

## Must-know commands:

- **Select rows**

```
SELECT customer_id, revenue
```

```
FROM sales
WHERE revenue > 1000;
```

- **Aggregation with GROUP BY**

```
SELECT region, AVG(revenue) AS avg_revenue
FROM sales
GROUP BY region;
```

- **Join tables**

```
SELECT o.order_id, c.customer_name, o.revenue
FROM orders o
JOIN customers c ON o.customer_id = c.customer_id;
```

- **Window function**

```
SELECT customer_id, revenue,
       RANK() OVER (ORDER BY revenue DESC) AS revenue_rank
FROM sales;
```

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## 3. Tableau / Power BI

For visualization & storytelling.

### Key visualizations:

- **Bar chart** → compare categories (e.g., revenue by region).
- **Line chart** → show trend over time.
- **Pie chart / Donut** → show percentage breakdown (use sparingly).
- **KPI cards** → highlight total sales, average order, etc.

### Dashboard example:

- KPI cards (Total Revenue, Avg Order Value)

- Line chart (Revenue over time)
  - Bar chart (Top 5 products)
  - Map (Sales by region)
  - Filter (date range, product category)
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## 4. Analytics Workflow (with just these tools)

### 1. Extract & clean

- Use SQL → get raw data
- Export into Excel/Sheets → clean (remove nulls, standardize values)

### 2. Analyze

- Pivot Table in Excel → quick summary
- SQL queries → deeper aggregation

### 3. Visualize & Present

- Import cleaned dataset into Tableau/Power BI
- Build dashboard with KPIs + trends + breakdowns
- Write insights in plain English