**🧠 1. Inspecting Data**

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| **Function** | **What It Does** |
| df.head(n) | Show the first *n* rows (default is 5) |
| df.tail(n) | Show the last *n* rows |
| df.info() | Summary of column types, non-null counts |
| df.describe() | Statistics for numeric columns (mean, std, min, etc.) |
| df.shape | Returns (rows, columns) |
| df.columns | Returns column names |
| df.index | Returns index (row labels) |

**🧼 2. Cleaning & Handling Data**

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| **Function** | **What It Does** |
| df.isnull() | Detect missing values (True/False) |
| df.notnull() | Opposite of isnull() |
| df.dropna() | Drop rows with missing data |
| df.fillna(value) | Replace missing data with a value |
| df.replace(old, new) | Replace values |
| df.duplicated() | Detect duplicate rows |
| df.drop\_duplicates() | Remove duplicate rows |

**🔍 3. Selecting / Filtering**

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| **Function** | **What It Does** |
| df['col'] or df.col | Select column |
| df[['col1', 'col2']] | Select multiple columns |
| df.iloc[i] | Select by **index number** (integer position) |
| df.loc[label] | Select by **row label/index** |
| df[df['col'] > 100] | Boolean filtering |
| df.query("col > 100") | Query with a string expression |

**🧮 4. Aggregating**

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| **Function** | **What It Does** |
| df.sum() | Sum of each column |
| df.mean() | Mean of each column |
| df.max() / df.min() | Max / Min values |
| df.count() | Number of non-null values |
| df.value\_counts() | Frequency counts (on Series only) |
| df.groupby('col') | Group by column (used with .sum(), .mean(), etc.) |

**✍️ 5. Modifying / Creating**

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| **Function** | **What It Does** |
| df['new'] = ... | Add new column |
| df.drop('col', axis=1) | Drop a column |
| df.rename(columns={'old': 'new'}) | Rename column |
| df.apply(function) | Apply function to column or row |
| df.assign(new\_col = ...) | Create column without modifying original df |

**📂 6. Merging & Joining**

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| **Function** | **What It Does** |
| pd.concat([df1, df2]) | Combine DataFrames (vertically/horizontally) |
| df1.merge(df2, on='key') | SQL-style merge |
| df.join(df2) | Join on index or column |

**📄 7. Reading & Writing Files**

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| **Function** | **What It Does** |
| pd.read\_csv('file.csv') | Read CSV file |
| df.to\_csv('file.csv') | Save DataFrame to CSV |
| pd.read\_excel('file.xlsx') | Read Excel file |
| df.to\_excel('file.xlsx') | Save to Excel file |