-- 1.Database Creation

```
CREATE TABLE sales_sample (
    Product_Id INTEGER,
    Region VARCHAR(50),
    Date DATE,
    Sales_Amount NUMERIC(10, 2)
);
```

-- 2.Data Creation

```
INSERT INTO sales_sample (Product_Id, Region, Date, Sales_Amount) VALUES
(01, 'East', '2025-11-14', 550.00),
(01, 'West', '2025-10-11', 350.50),
(02, 'East', '2025-10-12', 550.00),
(02, 'West', '2025-10-02', 650.25),
(03, 'East', '2025-10-03', 400.00),
(03, 'West', '2025-11-03', 250.00),
(01, 'East', '2025-10-17', 700.00),
(02, 'West', '2025-10-01', 150.00),
(03, 'East', '2025-11-22', 950.00),
(01, 'West', '2025-11-02', 850.75);
SELECT * FROM sales_sample;
```

Output:

```
CREATE TABLE
INSERT 0 10
 product_id | region |    date    | sales_amount
------------+--------+------------+--------------
          1 | East   | 2025-11-14 |       550.00
          1 | West   | 2025-10-11 |       350.50
          2 | East   | 2025-10-12 |       550.00
          2 | West   | 2025-10-02 |       650.25
          3 | East   | 2025-10-03 |       400.00
          3 | West   | 2025-11-03 |       250.00
          1 | East   | 2025-10-17 |       700.00
          2 | West   | 2025-10-01 |       150.00
          3 | East   | 2025-11-22 |       950.00
          1 | West   | 2025-11-02 |       850.75
(10 rows)
```

-- 3.Perform OLAP operations

-- a)Drill Down-Analyze sales data at a more detailed level. Write a query to perform drill down from region to product level to understand sales performance.

```
SELECT
    Region,
    Product_Id,
    SUM(Sales_Amount) AS Total_Sales
FROM
    sales_sample
GROUP BY
    Region,
    Product_Id -- Grouping by both region and product provides the detailed view
ORDER BY
    Region,
    Product_Id;
```

```
 region | product_id | total_sales
--------+------------+-------------
 East   |          1 |     1250.00
 East   |          2 |      550.00
 East   |          3 |     1350.00
 West   |          1 |     1201.25
 West   |          2 |      800.25
 West   |          3 |      250.00
(6 rows)
```

-- b)Rollup- To summarize sales data at different levels of granularity. Write a query to perform roll up from product to region level to view total sales by region.

```
SELECT
    COALESCE(Region, 'Grand Total') AS Region,
    COALESCE(CAST(Product_Id AS VARCHAR), 'Region Total') AS Product_Id_Detail,
    SUM(Sales_Amount) AS Total_Sales
FROM
    sales_sample
GROUP BY
    ROLLUP(Region, Product_Id)
```

```
ORDER BY
    GROUPING(Region),
    Region,
    GROUPING(Product_Id),
    Product_Id;
```

region	product_id_detail	total_sales
East	1	1250.00
East	2	550.00
East	3	1350.00
East	Region Total	3150.00
West	1	1201.25
West	2	800.25
West	3	250.00
West	Region Total	2251.50
Grand Total	Region Total	5401.50

(9 rows)

-- c)Cube - To analyze sales data from multiple dimensions simultaneously. Write a query to Explore sales data from different perspectives, such as product, region, and date

```
SELECT
    COALESCE(Region, 'All Regions') AS Region,
    COALESCE(CAST(Product_Id AS VARCHAR), 'All Products') AS Product_Id,
    COALESCE(CAST(EXTRACT(YEAR FROM Date) AS VARCHAR), 'All Years') AS Sales_Year, -- Use YEAR() for SQL Server/MySQL
    SUM(Sales_Amount) AS Total_Sales
FROM
    sales_sample
GROUP BY
    CUBE(Region, Product_Id, EXTRACT(YEAR FROM Date)) -- Use YEAR() for SQL Server/MySQL
ORDER BY
    Region,
    Product_Id,
    Sales_Year;
```

region	product_id	sales_year	total_sales
All Regions	1	2025	2451.25
All Regions	1	All Years	2451.25
All Regions	2	2025	1350.25
All Regions	2	All Years	1350.25
All Regions	3	2025	1600.00
All Regions	3	All Years	1600.00
All Regions	All Products	2025	5401.50
All Regions	All Products	All Years	5401.50
East	1	2025	1250.00
East	1	All Years	1250.00
East	2	2025	550.00
East	2	All Years	550.00
East	3	2025	1350.00
East	3	All Years	1350.00
East	All Products	2025	3150.00
East	All Products	All Years	3150.00
West	1	2025	1201.25
West	1	All Years	1201.25
West	2	2025	800.25
West	2	All Years	800.25
West	3	2025	250.00
West	3	All Years	250.00
West	All Products	2025	2251.50
West	All Products	All Years	2251.50

(24 rows)

-- d)Slice- To extract a subset of data based on specific criteria. Write a query to slice the data to view sales for a particular region or date range.

```
SELECT
    Product_Id,
    Region,
    Date,
    Sales_Amount
FROM
    sales_sample
WHERE
    Date >= '2025-10-01' AND Date <= '2025-10-31'
ORDER BY
    Date;
```

```
 product_id | region |    date    | sales_amount
------------+--------+------------+--------------
          2 | West   | 2025-10-01 |       150.00
          2 | West   | 2025-10-02 |       650.25
          3 | East   | 2025-10-03 |       400.00
          1 | West   | 2025-10-11 |       350.50
          2 | East   | 2025-10-12 |       550.00
          1 | East   | 2025-10-17 |       700.00
(6 rows)
```

-- e)Dice - To extract data based on multiple criteria. Write a query to view sales for specific combinations of product, region, and date

```
SELECT
    Product_Id,
    Region,
    Date,
    Sales_Amount
FROM
    sales_sample
WHERE
    Region = 'West'
    AND Product_Id IN (1, 2)
    AND Date >= '2025-10-01'
    AND Date <= '2025-10-31'
ORDER BY
    Date,
    Product_Id;
```

```
 product_id | region |    date    | sales_amount
------------+--------+------------+--------------
          2 | West   | 2025-10-01 |       150.00
          2 | West   | 2025-10-02 |       650.25
          1 | West   | 2025-10-11 |       350.50
(3 rows)
```