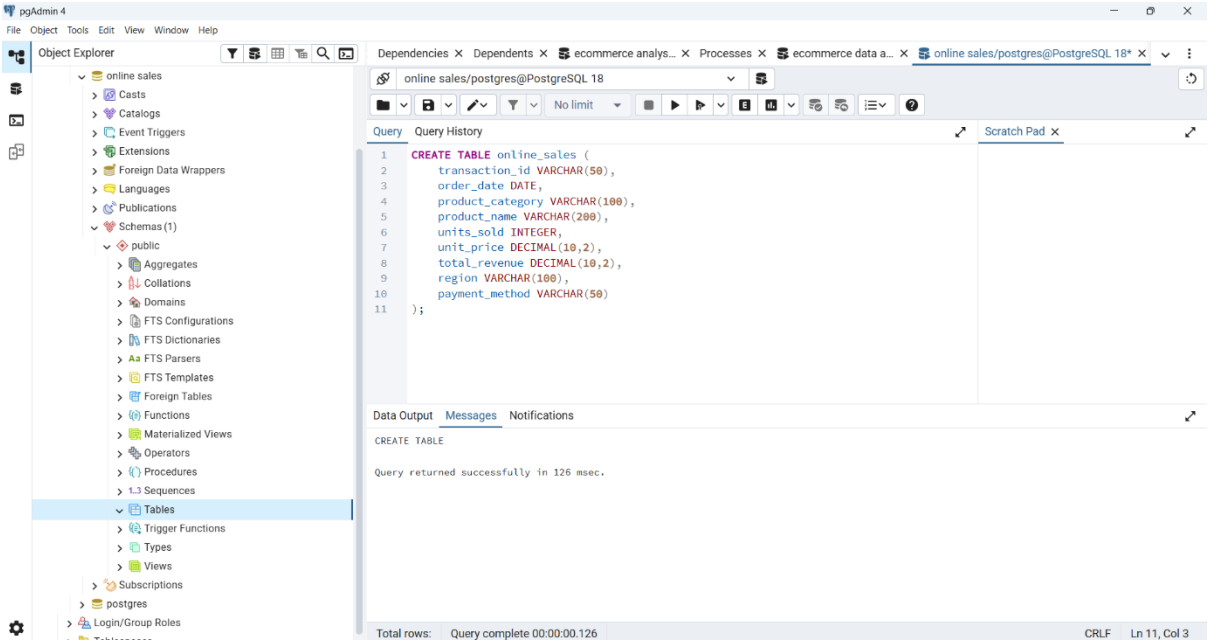
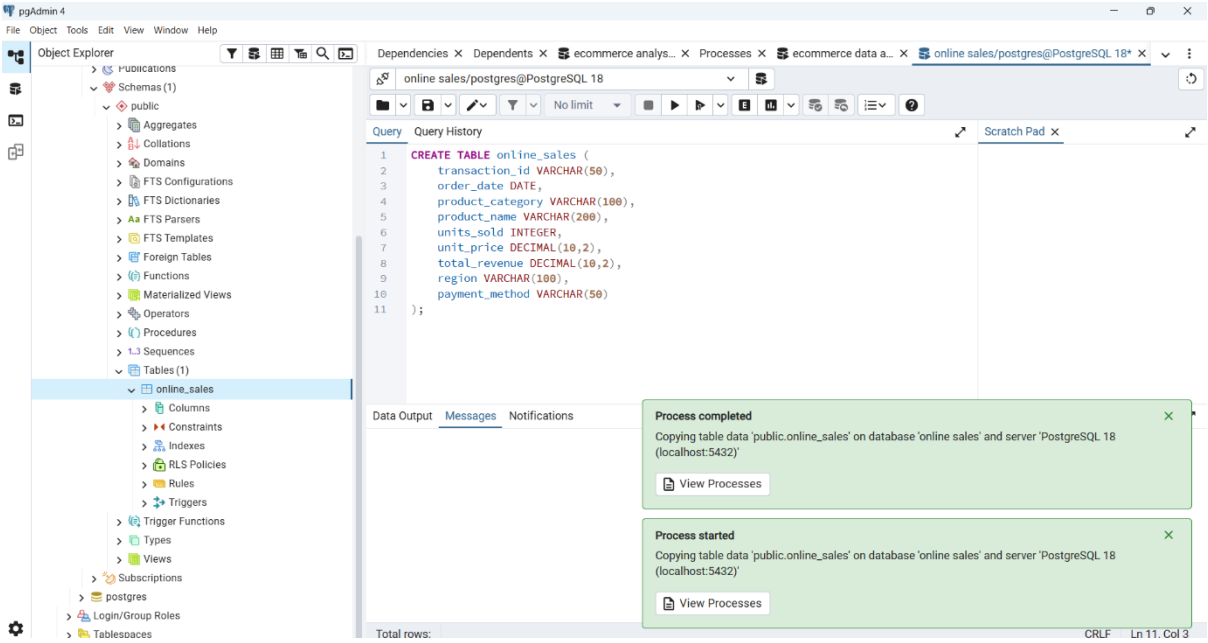
Task- 6

Sales Trend Analysis Using Aggregations

Created the online_sales table with the required columns (transaction_id, order_date, product_category, product_name, units_sold, unit_price, total_revenue, region, payment_method). This matches the dataset structure from the Kaggle Online Sales Dataset.

```
CREATE TABLE online_sales (
    transaction_id VARCHAR(50),
    order_date DATE,
    product_category VARCHAR(100),
    product_name VARCHAR(200),
    units_sold INTEGER,
    unit_price DECIMAL(10,2),
    total_revenue DECIMAL(10,2),
    region VARCHAR(100),
    payment_method VARCHAR(50)
);
```

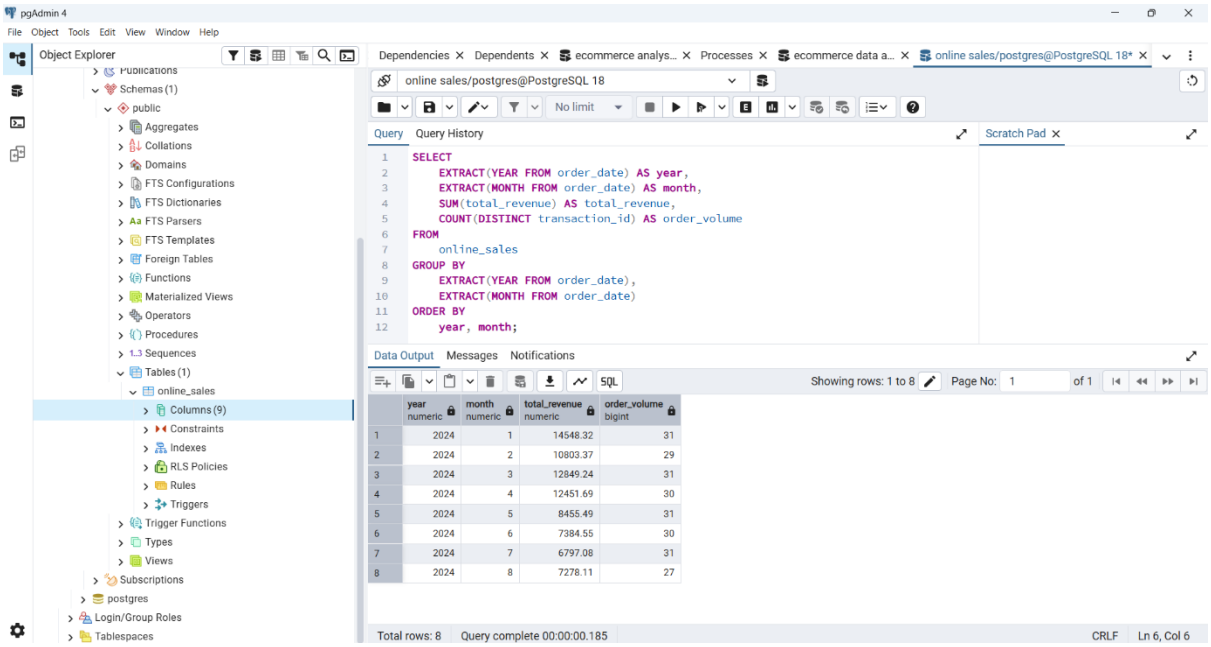




Validation query to check revenue consistency (unit_price * units_sold vs. total_revenue).

```
SELECT
    EXTRACT(YEAR FROM order_date) AS year,
    EXTRACT(MONTH FROM order_date) AS month,
    SUM(total_revenue) AS total_revenue,
    COUNT(DISTINCT transaction_id) AS order_volume
```

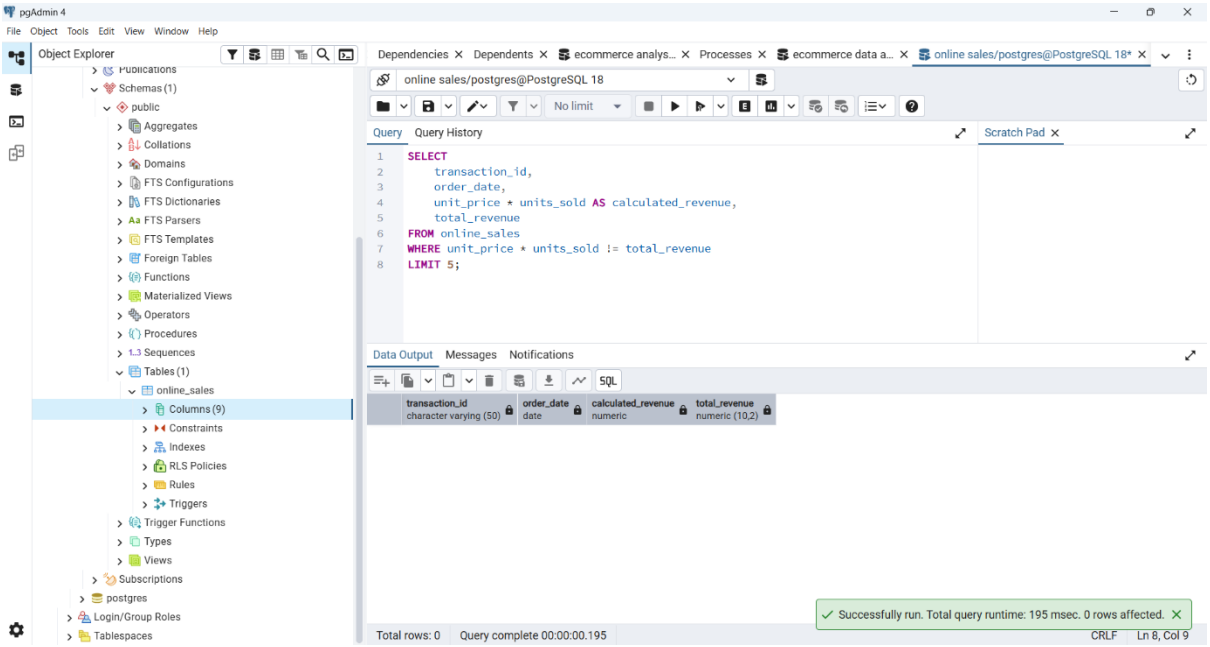
```
FROM
    online_sales
GROUP BY
    EXTRACT(YEAR FROM order_date),
    EXTRACT(MONTH FROM order_date)
ORDER BY
    year, month;
```



Enhanced query with month names (TO_CHAR(order_date, 'Month')) and fixed GROUP BY/ORDER BY.

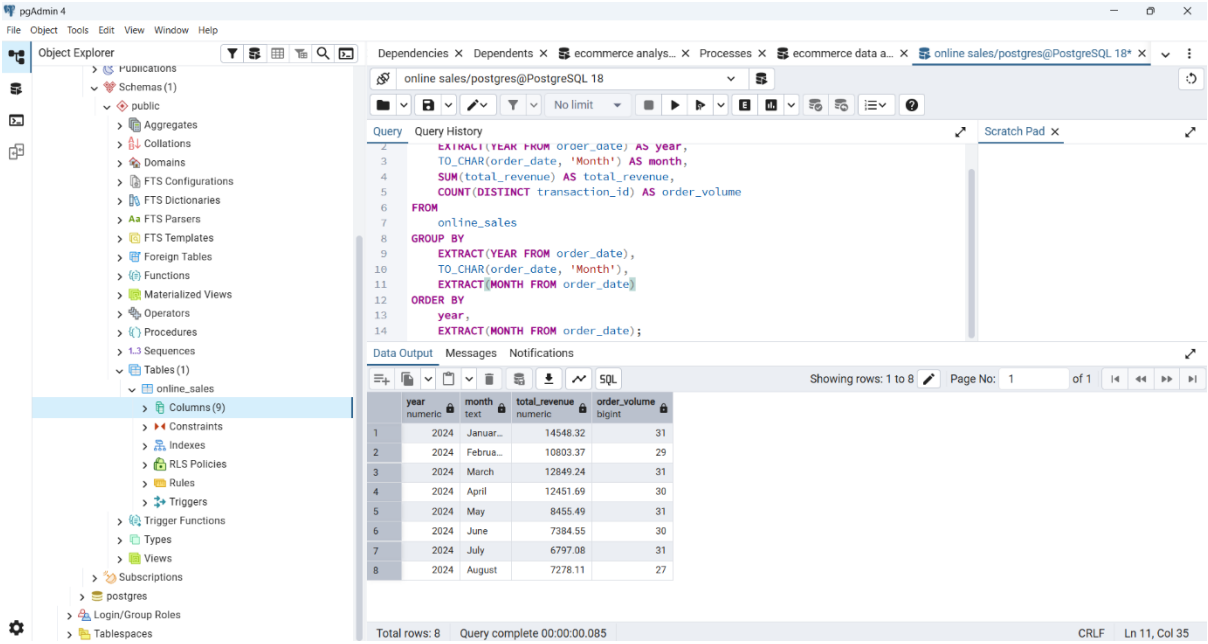
```
SELECT
    transaction_id,
    order_date,
    unit_price * units_sold AS calculated_revenue,
    total_revenue
FROM online_sales
WHERE unit_price * units_sold != total_revenue
```

LIMIT 5;



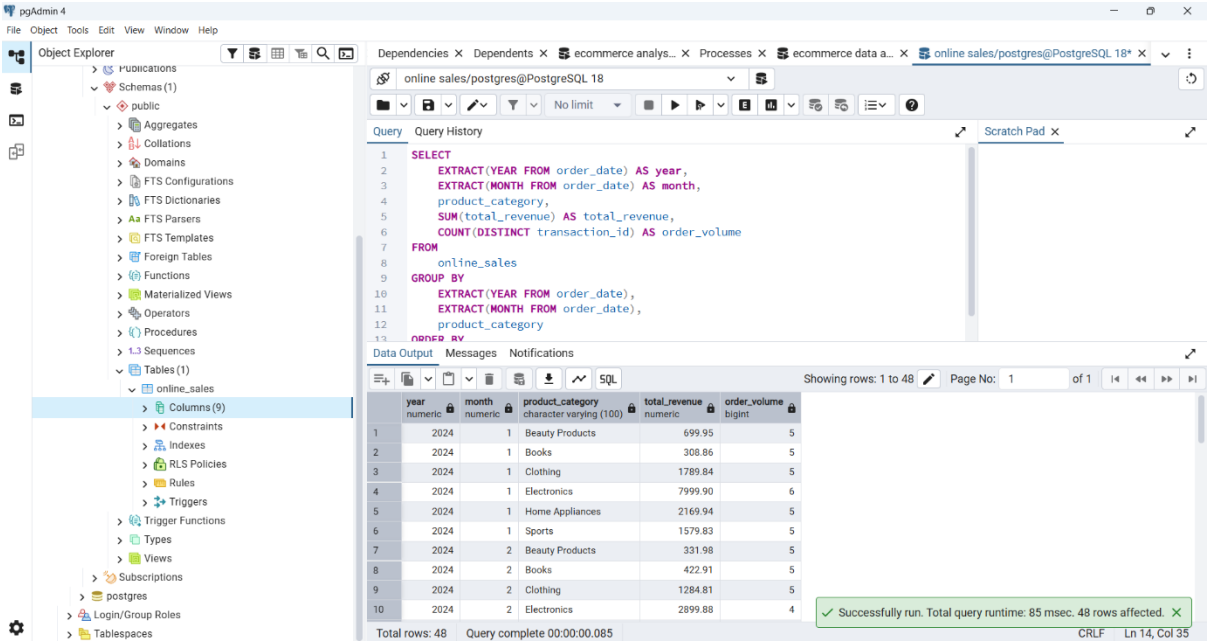
Analysis by product category.

```
SELECT
    EXTRACT(YEAR FROM order_date) AS year,
    TO_CHAR(order_date, 'Month') AS month,
    SUM(total_revenue) AS total_revenue,
    COUNT(DISTINCT transaction_id) AS order_volume
FROM
    online_sales
GROUP BY
    EXTRACT(YEAR FROM order_date),
    TO_CHAR(order_date, 'Month'),
    EXTRACT(MONTH FROM order_date) -- Add this to match ORDER BY
ORDER BY
    year,
    EXTRACT(MONTH FROM order_date);
```



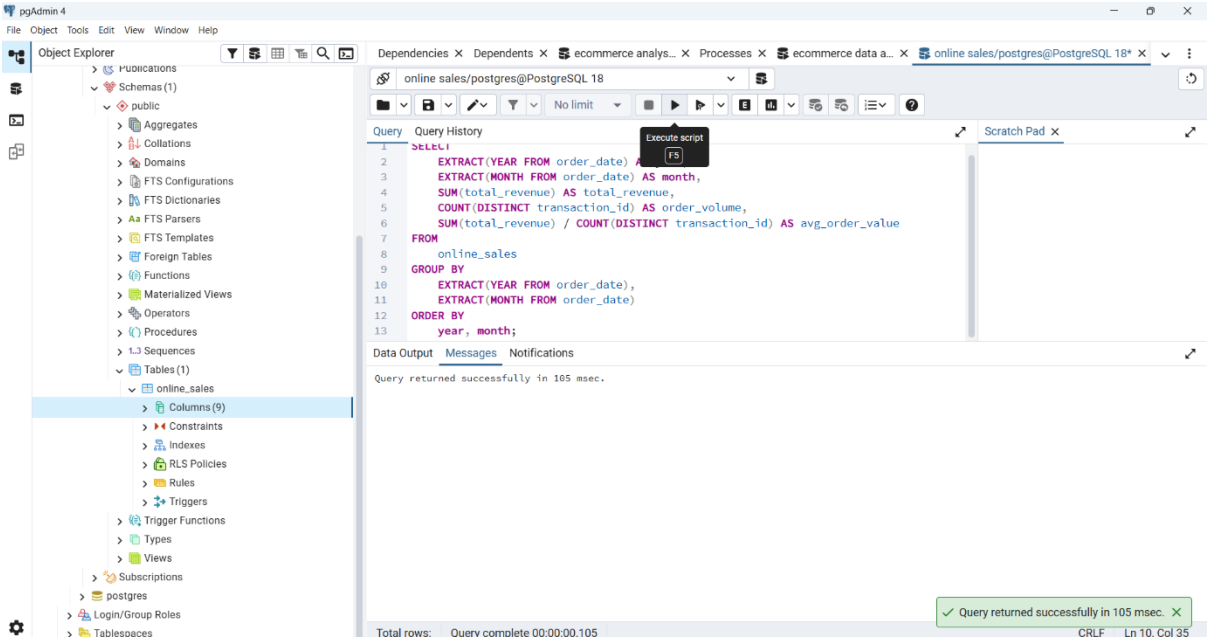
Analysis by region (latest query), with validation.

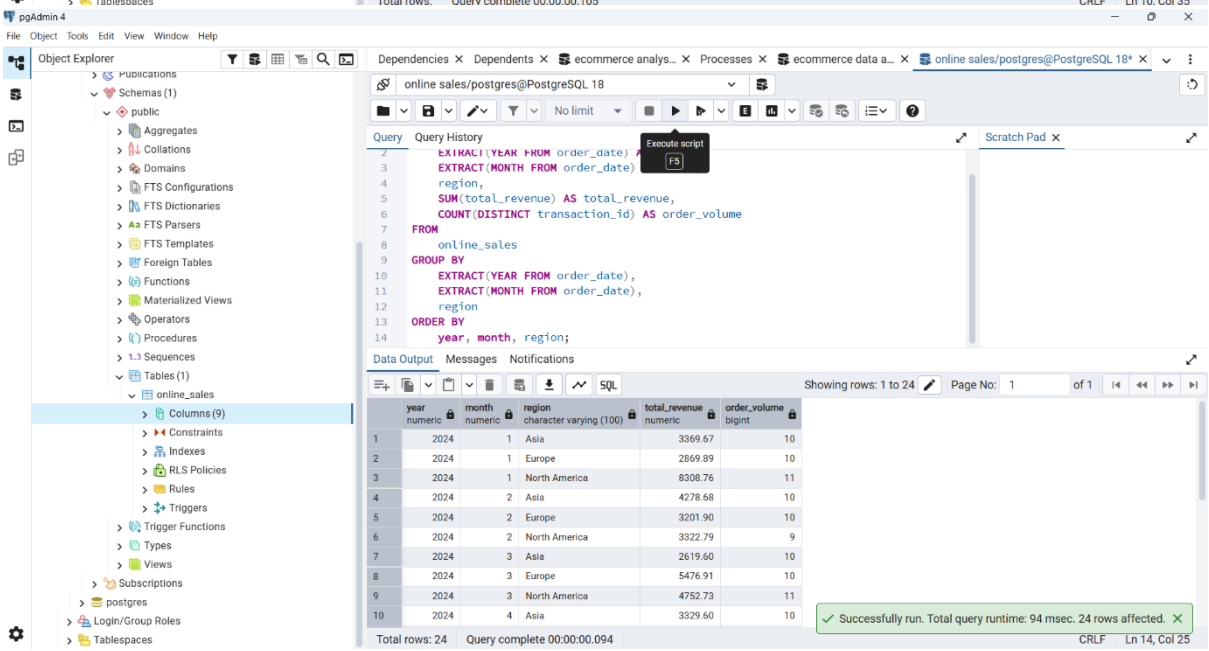
```
SELECT
    EXTRACT(YEAR FROM order_date) AS year,
    EXTRACT(MONTH FROM order_date) AS month,
    product_category,
    SUM(total_revenue) AS total_revenue,
    COUNT(DISTINCT transaction_id) AS order_volume
FROM
    online_sales
GROUP BY
    EXTRACT(YEAR FROM order_date),
    EXTRACT(MONTH FROM order_date),
    product_category
ORDER BY
    year, month, product_category;
```



Analysis by region (latest query), with validation.

```
SELECT
    EXTRACT(YEAR FROM order_date) AS year,
    EXTRACT(MONTH FROM order_date) AS month,
    region,
    SUM(total_revenue) AS total_revenue,
    COUNT(DISTINCT transaction_id) AS order_volume
FROM
    online_sales
GROUP BY
    EXTRACT(YEAR FROM order_date),
    EXTRACT(MONTH FROM order_date),
    region
ORDER BY
    year, month, region;
```





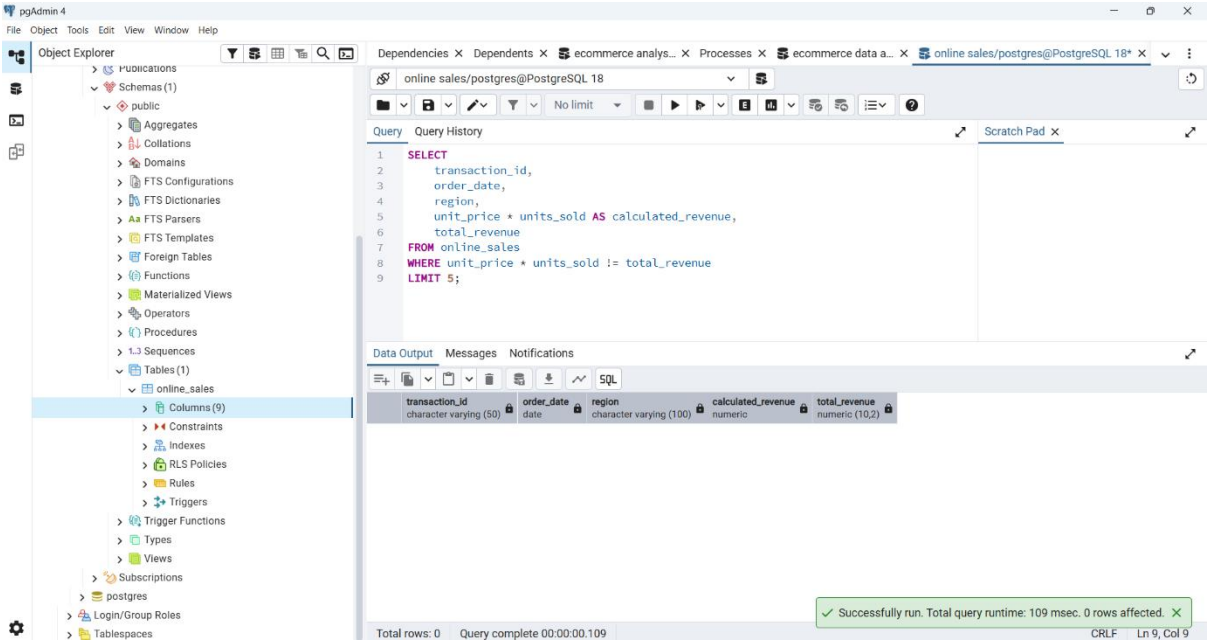
Combined region + product category

```
SELECT
    transaction_id,
    order_date,
    region,
    unit_price * units_sold AS calculated_revenue,
    total_revenue
```

FROM online_sales

WHERE unit_price * units_sold != total_revenue

LIMIT 5;



By region + payment method.

SELECT

EXTRACT(YEAR FROM order_date) AS year,

TO_CHAR(order_date, 'Month') AS month,

region,

product_category,

SUM(total_revenue) AS total_revenue,

COUNT(DISTINCT transaction_id) AS order_volume

FROM

online_sales

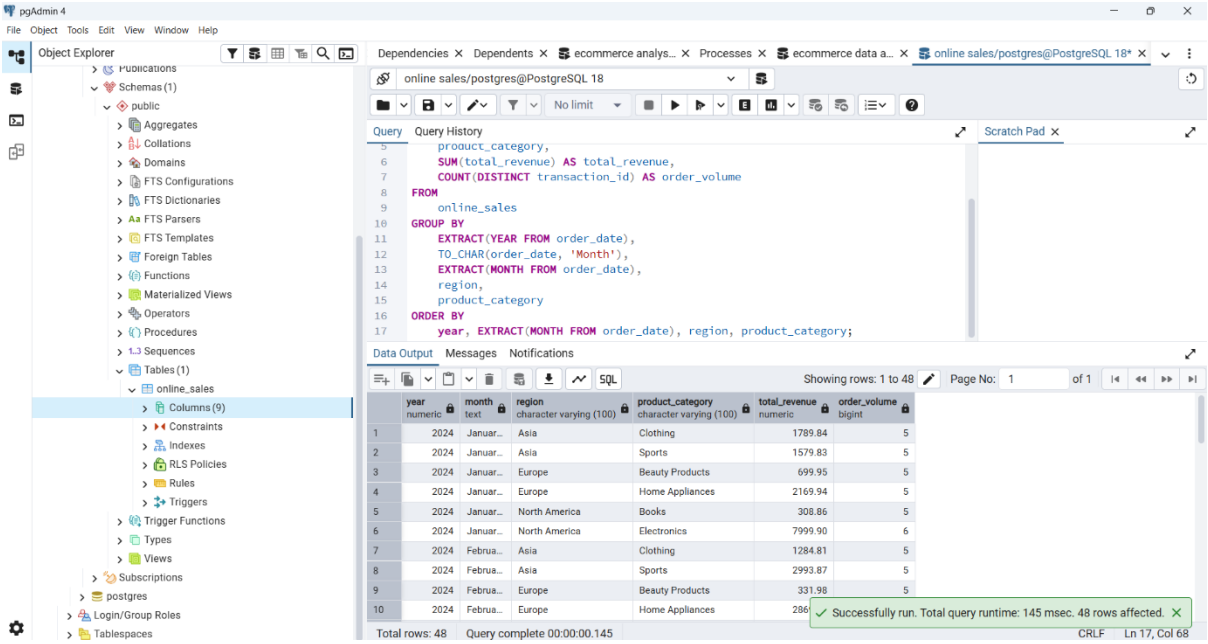
GROUP BY

EXTRACT(YEAR FROM order_date),

TO_CHAR(order_date, 'Month'),

EXTRACT(MONTH FROM order_date),

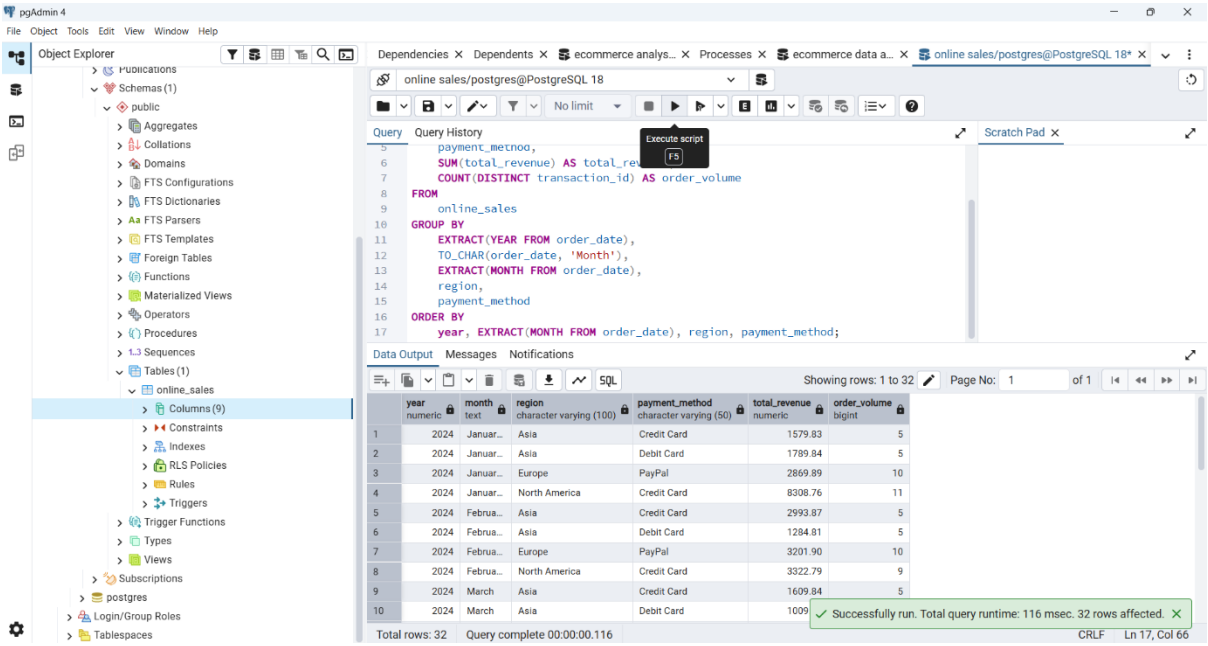
```
    region,
    product_category
ORDER BY
    year, EXTRACT(MONTH FROM order_date), region, product_category;
```



Added average order value.

```
SELECT
    EXTRACT(YEAR FROM order_date) AS year,
    TO_CHAR(order_date, 'Month') AS month,
    region,
    payment_method,
    SUM(total_revenue) AS total_revenue,
    COUNT(DISTINCT transaction_id) AS order_volume
FROM
    online_sales
GROUP BY
    EXTRACT(YEAR FROM order_date),
    TO_CHAR(order_date, 'Month'),
```

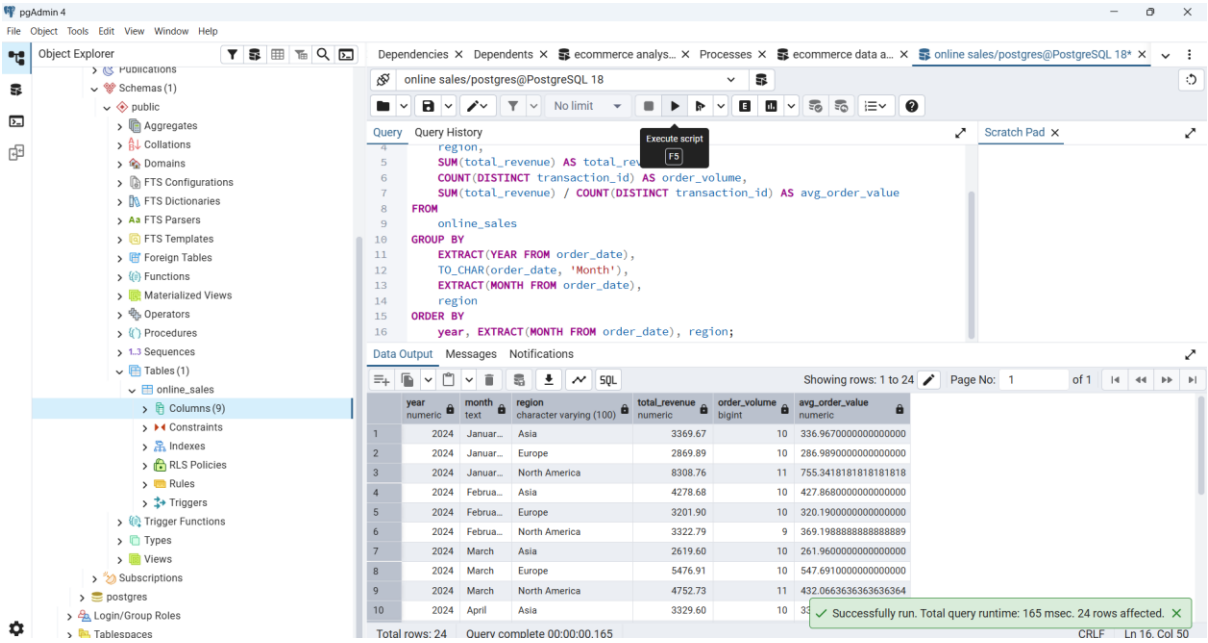
```
    EXTRACT(MONTH FROM order_date),
    region,
    payment_method
ORDER BY
    year, EXTRACT(MONTH FROM order_date), region, payment_method;
```



Advanced CTE for year-over-year revenue growth percent by region

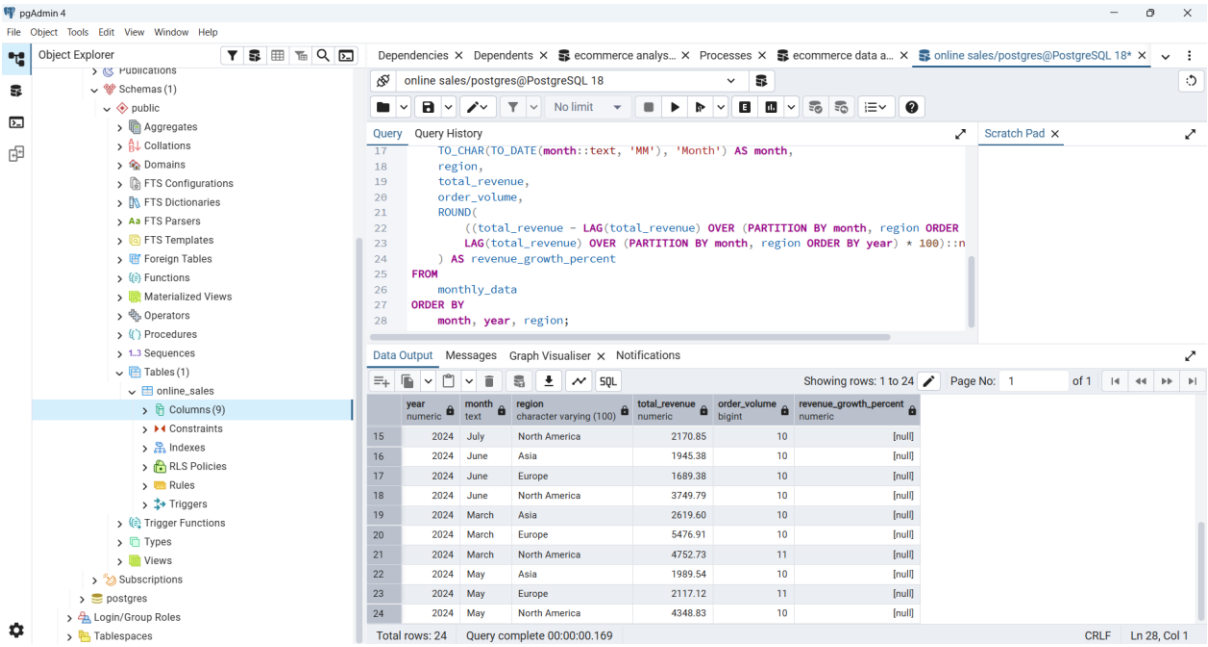
```
SELECT
    EXTRACT(YEAR FROM order_date) AS year,
    TO_CHAR(order_date, 'Month') AS month,
    region,
    SUM(total_revenue) AS total_revenue,
    COUNT(DISTINCT transaction_id) AS order_volume,
    SUM(total_revenue) / COUNT(DISTINCT transaction_id) AS
avg_order_value
FROM
    online_sales
GROUP BY
```

```
    EXTRACT(YEAR FROM order_date),
    TO_CHAR(order_date, 'Month'),
    EXTRACT(MONTH FROM order_date),
    region
ORDER BY
    year, EXTRACT(MONTH FROM order_date), region;
```




```
WITH monthly_data AS (
    SELECT
        EXTRACT(YEAR FROM order_date) AS year,
        EXTRACT(MONTH FROM order_date) AS month,
        region,
        SUM(total_revenue) AS total_revenue,
        COUNT(DISTINCT transaction_id) AS order_volume
    FROM
        online_sales
    GROUP BY
        EXTRACT(YEAR FROM order_date),
        EXTRACT(MONTH FROM order_date),
```

```
        region
)
SELECT
    year,
    TO_CHAR(TO_DATE(month::text, 'MM'), 'Month') AS month,
    region,
    total_revenue,
    order_volume,
    ROUND(
        ((total_revenue - LAG(total_revenue) OVER (PARTITION BY month, region ORDER BY year)) /
        LAG(total_revenue) OVER (PARTITION BY month, region ORDER BY year) * 100)::numeric, 2
    ) AS revenue_growth_percent
FROM
    monthly_data
ORDER BY
    month, year, region;
```



	year numeric	month text	region character varying (100)	total_revenue numeric	order_volume bigint	revenue_growth_percent numeric
15	2024	July	North America	2170.85	10	[null]
16	2024	June	Asia	1945.38	10	[null]
17	2024	June	Europe	1689.38	10	[null]
18	2024	June	North America	3749.79	10	[null]
19	2024	March	Asia	2619.60	10	[null]
20	2024	March	Europe	5476.91	10	[null]
21	2024	March	North America	4752.73	11	[null]
22	2024	May	Asia	1989.54	10	[null]
23	2024	May	Europe	2117.12	11	[null]
24	2024	May	North America	4348.83	10	[null]