

1. Second highest salary

- `SELECT MAX(salary)`
- `FROM employees`
- `WHERE salary < (SELECT MAX(salary) FROM employees);`
-  Uses subquery to exclude the top salary.

2. Department-wise avg salary (with >5 employees)

- `SELECT department_id, AVG(salary) AS avg_salary`
- `FROM employees`
- `GROUP BY department_id`
- `HAVING COUNT(*) > 5;`

-  `HAVING` filters aggregated groups.

3. Customers with >3 orders in last 30 days

- SELECT customer_id
- FROM orders
- WHERE order_date >= CURRENT_DATE - INTERVAL '30 days'
- GROUP BY customer_id
- HAVING COUNT(*) > 3;
-  Aggregation + date filter.

4. Find duplicates on multiple fields

- `SELECT col1, col2, COUNT(*)`
- `FROM my_table`
- `GROUP BY col1, col2`
- `HAVING COUNT(*) > 1;`
-  Helps detect data quality issues.

5. Transpose rows into columns using CASE

- SELECT
- user_id,
- MAX(CASE WHEN month = 'Jan' THEN spend
END) AS Jan,
- MAX(CASE WHEN month = 'Feb' THEN spend
END) AS Feb
- FROM user_spend
- GROUP BY user_id;

6. INNER JOIN vs EXISTS

- SELECT name
- FROM customers c
- WHERE EXISTS (
- SELECT 1 FROM orders o WHERE
 o.customer_id = c.id
-);
-  `EXISTS` stops at the first match. Good for correlated subqueries.

7. Products never sold

- `SELECT p.*`
- `FROM products p`
- `LEFT JOIN order_items o ON p.id =`
`o.product_id`
- `WHERE o.product_id IS NULL;`

-  `'LEFT JOIN' + NULL check = "no match"`
rows.

8. Highest order value per customer

- `SELECT o.*`
- `FROM orders o`
- `WHERE amount = (`
- `SELECT MAX(amount) FROM orders WHERE`
`customer_id = o.customer_id`
- `);`
-  Correlated subquery per customer.

9. Compare today vs yesterday active users

- WITH daily_users AS (
 - SELECT activity_date, COUNT(DISTINCT user_id) AS user_count
 - FROM activity_log
 - WHERE activity_date IN (CURRENT_DATE, CURRENT_DATE - 1)
 - GROUP BY activity_date
 -)
 - SELECT
-

10. Recursive CTE for hierarchy

- WITH RECURSIVE org_chart AS (
- SELECT id, parent_id, 1 AS level
- FROM employees
- WHERE parent_id IS NULL
- UNION ALL
- SELECT e.id, e.parent_id, oc.level + 1
- FROM employees e
- JOIN org_chart oc ON e.parent_id = oc.id
-)

11. Rank products by sales within each category

- `SELECT product_id, category,`
- `RANK() OVER (PARTITION BY category`
`ORDER BY total_sales DESC) AS rnk`
- `FROM product_sales;`

-  `'RANK()'` gives position per category.

12. 7-day rolling avg website visits

- `SELECT visit_date,`
- `AVG(visits) OVER (ORDER BY visit_date
ROWS BETWEEN 6 PRECEDING AND CURRENT
ROW) AS rolling_avg`
- `FROM web_traffic;`

-  Smooth trends using sliding windows.

13. First and last transaction per user

- SELECT *
 - FROM (
 - SELECT *,
 - ROW_NUMBER() OVER (PARTITION BY user_id ORDER BY tx_date ASC) AS rn_asc,
 - ROW_NUMBER() OVER (PARTITION BY user_id ORDER BY tx_date DESC) AS rn_desc
 - FROM transactions
 -) t
-

14. Detect gaps in sequential dates

- `SELECT date,`
- `LAG(date) OVER (ORDER BY date) AS prev_date,`
- `date - LAG(date) OVER (ORDER BY date) AS gap`
- `FROM events;`
-  Easily identify missing dates or IDs.

15. Cumulative spend per customer per month

- `SELECT customer_id, month,`
- `SUM(spend) OVER (PARTITION BY`
`customer_id ORDER BY month) AS cum_spend`
- `FROM monthly_spend;`

-  Running totals within groups.