Subqueries:

A subquery in MySQL is a query embedded within another SQL query, also known as an inner query or nested query.

Types of Subqueries:

Single Row Subquery:

```
SELECT first_name, salary
FROM employees
WHERE salary > (SELECT AVG(salary) FROM employees);
```

Multi Row Subquery:

```
SELECT employee_name
FROM employees
WHERE department_id IN (SELECT department_id FROM departments WHERE location
= 'New York');
```

Correlated Subquery:

```
SELECT
    e1.employee_number,
    e1.name,
    e1.salary,
    e1.department
FROM
    employees e1
WHERE
    e1.salary > (SELECT AVG(e2.salary) FROM employees e2 WHERE e2.department =
e1.department);
```

RANK() Function:

Assigns a rank to each row within a partition of a result set.

Assigns the same rank to rows with identical values in the ordering column(s).

Skips subsequent rank numbers after ties. For example, if two rows are ranked 1, the next distinct rank will be 3.

```
SELECT

   column1,

   column2,

   RANK() OVER (ORDER BY column2 DESC) AS rank_value
```

```
FROM
    your_table;
```

DENSE_RANK() Function:

Similar to RANK(), it assigns ranks to rows within a partition.

Assigns the same rank to rows with identical values in the ordering column(s).

Unlike RANK(), it does not skip subsequent rank numbers after ties. For example, if two rows are ranked 1, the next distinct rank will be 2

```
SELECT
    column1,
    column2,
    DENSE_RANK() OVER (ORDER BY column2 DESC) AS dense_rank_value
FROM
    your_table;
```

NTILE() Function:

Example:

To divide employees into 3 groups based on their salary, within each department:

```
SELECT
    employee_name,
    department,
    salary,
    NTILE(3) OVER (PARTITION BY department ORDER BY salary DESC) AS salary_group
FROM
    Employees;
```

In this example:

NTILE(3) specifies that 3 groups should be created.

PARTITION BY department means the grouping will be done separately for each department.

ORDER BY salary DESC ensures that within each department, employees are ordered by salary in descending order before being assigned to a group. The highest-earning employees in each department will be in group 1, followed by group 2, and so on.