GROUP BY:

- The GROUP BY clause groups a set of rows into a set of summary rows by values of columns or expressions. The GROUP BY clause returns one row for each group. In other words, it reduces the number of rows in the result set.
- The GROUP BY clause is an optional clause of the SELECT statement.

```
SELECT
    c1, c2,..., cn, aggregate_function(ci)
FROM
    table
WHERE
    where_conditions
GROUP BY c1 , c2,...,cn;
```

- In this syntax, you place the GROUP BY clause after the FROM and WHERE clauses. After the GROUP BY keywords, you place is a list of comma-separated columns or expressions to group rows.
- MySQL evaluates the GROUP BY clause after the FROM and WHERE clauses and before the HAVING, SELECT, DISTINCT, ORDER BY and LIMIT clauses.

HAVING:

- The HAVING clause is used in the SELECT statement to specify filter conditions for a group of rows or aggregates.
- The HAVING clause is often used with the GROUP BY clause to filter groups based on a specified condition. If you omit the GROUP BY clause, the HAVING clause behaves like the WHERE clause.

```
SELECT
    select_list
FROM
    table_name
WHERE
    search_condition
GROUP BY
    group_by_expression
HAVING
    group_condition;
```

- The HAVING clause evaluates each group returned by the GROUP BY clause. If the result is true, the row is included in the result set.
- Notice that the HAVING clause applies a filter condition to each group of rows, while the WHERE clause applies the filter condition to each individual row.

SUM:

- The SUM() function is an aggregate function that allows you to calculate the sum of values in a set.

```
SUM(DISTINCT expression)
```

- The DISTINCT option instructs the SUM() function to calculate the sum of only distinct values in a set.

AVG:

- The MySQL AVG() function is an aggregate function that allows you to calculate the average value of a set.

```
AVG(DISTINCT expression)
```

- You use the DISTINCT operator in the AVG function to calculate the average value of the distinct values.

MIN:

- The MIN() function returns the minimum value in a set of values. The MIN() function is very useful in some scenarios such as finding the smallest number, selecting the least expensive product, or getting the lowest credit limit.

```
MIN(DISTINCT expression);
```

- In this syntax, the MIN() function accepts an expression which can be a column or a valid expression that involves columns.

MAX:

- The MySQL MAX() function returns the maximum value in a set of values. The MAX() function comes in handy in many cases such as finding the greatest number, the most expensive product, and the largest payment from customers.

```
MAX(DISTINCT expression)
```

- If you add the DISTINCT operator, the MAX() function returns the maximum value of distinct values, which is the same as the maximum value of all values. It means that DISTINCT does not take any effects in the MAX() function.

COUNT:

- The COUNT() function is an aggregate function that returns the number of rows in a table. The COUNT() function allows you to count all rows or only rows that match a specified condition.
- The COUNT() function has three forms: COUNT(*), COUNT(expression) and COUNT(DISTINCT expression).
- The COUNT(*) function returns the number of rows in a result set returned by a SELECT statement.
- The COUNT(expression) returns the number of rows that do not contain NULL values as the result of the expression.
- The COUNT(DISTINCT expression) returns the number of distinct rows that do not contain NULL values as the result of the expression.
- The return type of the COUNT() function is BIGINT. The COUNT() function returns 0 if there is no matching row found.

String Functions:

Name	Description
CONCAT	Concatenate two or more strings into a single string
INSTR	Return the position of the first occurrence of a substring in a string
LENGTH	Get the length of a string in bytes and in characters
LEFT	Get a specified number of leftmost characters from a string
LOWER	Convert a string to lowercase
LTRIM	Remove all leading spaces from a string
REPLACE	Search and replace a substring in a string
RIGHT	Get a specified number of rightmost characters from a string
RTRIM	Remove all trailing spaces from a string
SUBSTRING	Extract a substring starting from a position with a specific length.
SUBSTRING_INDEX	Return a substring from a string before a specified number of occurrences of a delimiter
TRIM	Remove unwanted characters from a string.
FIND_IN_SET	Find a string within a comma-separated list of strings
FORMAT	Format a number with a specific locale, rounded to the number of decimals
UPPER	Convert a string to uppercase

Date & Time Functions:

- NOW: Returns current date-time
- CURRENT_DATE: Returns today's date
- CURRENT_TIME: Returns current time
- CURRENT_TIMESTAMP: Same as now
- YEAR: Returns year of the date
- QUARTER: Returns quarter of the date
- MONTH: Returns month number of the date
- DAY: Returns day number of the date
- WEEK: Returns week number of the date
- MONTHNAME: Returns name of the month from the date
- DAYNAME: : Returns name of the day from the date
- DAYOFWEEK: : Returns the position of the day in that week of the date
- HOUR: Returns the hour part of the date
- MINUTE: Returns the minute part of the date
- SECOND: Returns the second part of the date
- DATE_FORMAT: Used to format the date in any form
- DATE_ADD: Used to add/subtract the day/month/year/hour/minute/second
- DATEDIFF: Used to find the difference between the two dates in number of days
- TIMESTAMPDIFF: Used to find the difference between the two dates in year/month/day/hour/minute/second form