Let’s go **through SQL mathematical (numeric) functions** in detail with **syntax and examples**. These are used to perform **calculations on numeric data** in SQL.

**1. ABS() – Absolute Value**

* **Purpose:** Returns the absolute (non-negative) value of a number.
* **Syntax:**

ABS(number)

* **Example:**

SELECT ABS(-50) AS AbsoluteValue; -- Output: 50

SELECT ABS(Salary - 50000) AS DiffSalary

FROM Employees;

**2. CEIL() / CEILING() – Round Up**

* **Purpose:** Rounds a number **up** to the nearest integer.
* **Syntax:**

CEIL(number) -- MySQL, Oracle

CEILING(number) -- SQL Server

* **Example:**

SELECT CEIL(4.2) AS RoundedUp; -- Output: 5

SELECT CEIL(-4.8) AS RoundedUp; -- Output: -4

**3. FLOOR() – Round Down**

* **Purpose:** Rounds a number **down** to the nearest integer.
* **Syntax:**

FLOOR(number)

* **Example:**

SELECT FLOOR(4.8) AS RoundedDown; -- Output: 4

SELECT FLOOR(-4.2) AS RoundedDown; -- Output: -5

**4. ROUND() – Round to Specific Decimal**

* **Purpose:** Rounds a number to specified decimal places.
* **Syntax:**

ROUND(number, decimals)

* **Example:**

SELECT ROUND(123.4567, 2) AS Rounded; -- Output: 123.46

SELECT ROUND(123.4567, 0) AS Rounded; -- Output: 123

**5. POWER() / POW() – Exponentiation**

* **Purpose:** Raises a number to a specified power.
* **Syntax:**

POWER(base, exponent)

POW(base, exponent)

* **Example:**

SELECT POWER(2, 3) AS Result; -- Output: 8

SELECT POW(5, 2) AS Result; -- Output: 25

**6. SQRT() – Square Root**

* **Purpose:** Returns the square root of a number.
* **Syntax:**

SQRT(number)

* **Example:**

SELECT SQRT(25) AS Root; -- Output: 5

SELECT SQRT(Salary) FROM Employees;

**7. MOD() / % – Modulus (Remainder)**

* **Purpose:** Returns the remainder of a division.
* **Syntax:**

MOD(number, divisor) -- MySQL, Oracle

number % divisor -- SQL Server

* **Example:**

SELECT MOD(10, 3) AS Remainder; -- Output: 1

SELECT 10 % 3 AS Remainder; -- SQL Server Output: 1

**8. TRUNCATE() / TRUNC() – Remove Decimal Part**

* **Purpose:** Truncates a number to specified decimal places **without rounding**.
* **Syntax:**

TRUNCATE(number, decimals) -- MySQL

TRUNC(number, decimals) -- Oracle

* **Example:**

SELECT TRUNCATE(123.4567, 2) AS Truncated; -- Output: 123.45

SELECT TRUNC(123.4567, 0) AS Truncated; -- Output: 123

**9. SIGN() – Sign of Number**

* **Purpose:** Returns **1**, **0**, or **-1** depending on whether the number is positive, zero, or negative.
* **Syntax:**

SIGN(number)

* **Example:**

SELECT SIGN(25) AS SignValue; -- Output: 1

SELECT SIGN(-10) AS SignValue; -- Output: -1

SELECT SIGN(0) AS SignValue; -- Output: 0

**10. EXP() / LN() / LOG() – Exponential and Logarithms**

| **Function** | **Purpose** | **Syntax** | **Example** |
| --- | --- | --- | --- |
| EXP(x) | Returns e^x | EXP(2) | 7.389056 |
| LN(x) | Natural log (base e) | LN(7.389056) | 2 |
| LOG(x) | Logarithm base 10 | LOG(100) | 2 |

**11. RANDOM() / RAND() – Random Numbers**

* **Purpose:** Generates random numbers between 0 and 1.
* **Syntax:**

RAND() -- MySQL, SQL Server

DBMS\_RANDOM.VALUE -- Oracle

* **Example:**

SELECT RAND() AS RandomNumber;

SELECT FLOOR(RAND()\*100) AS Random0to99; -- Random integer 0-99

**12. Example Queries with Multiple Math Functions**

**a) Employee Salary Adjustments**

SELECT Name,

Salary,

ROUND(Salary \* 1.10, 2) AS IncreasedSalary,

CEIL(Salary/1000)\*1000 AS RoundedUpSalary,

FLOOR(Salary/1000)\*1000 AS RoundedDownSalary,

MOD(Salary, 500) AS Remainder

FROM Employees;

**b) Square root and power**

SELECT Name,

SQRT(Salary) AS SalaryRoot,

POWER(Salary, 2) AS SalarySquared

FROM Employees;

**Key Notes:**

1. Most math functions **ignore NULL values**.
2. ROUND, CEIL, FLOOR, TRUNCATE help control decimal precision.
3. MOD, SIGN, POWER, SQRT are useful in calculations for reports or analytics.