Practical 3:

Part 4:

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SQL Numeric Functions

SQL **Numeric Functions** are essential tools for performing **mathematical** and arithmetic operations on numeric data. These functions allow you to manipulate numbers, perform calculations, and **aggregate data** for reporting and analysis purposes.

Note: In this Lab Manual, examples are based on ORACLE SQLPLUS and MYSQL for your support but you are free to use any platform.

Numeric Functions in SQL*Plus (Oracle) and MySQL

Function	Description
ABS(n)	Returns the absolute value of n
ACOS(n)	Returns the arc cosine (inverse cosine) of n
ASIN(n)	Returns the arc sine (inverse sine) of n
ATAN(n)	Returns the arc tangent (inverse tangent) of n

ATN2(y, x) (SQL Server only)	Returns the angle whose tangent is the quotient of two arguments (Not available in Oracle/MySQL)

AVG(expression) Returns the average of a set of values

CEILING(n) Returns the smallest integer greater than or equal to n

COUNT(expression)	Returns the number of rows matching a condition
COS(n)	Returns the cosine of n (in radians)
COT(n)	Returns the cotangent of n
DEGREES(n)	Converts radians to degrees
EXP(n)	Returns e raised to the power of n
FLOOR(n)	Returns the largest integer less than or equal to n
LOG(n)	Returns the natural logarithm (base e) of n
LOG10(n)	Returns the base-10 logarithm of n
MAX(expression)	Returns the maximum value in a column
MIN(expression)	Returns the minimum value in a column
PI()	Returns the value of π (pi)
POWER(x, y)	Returns x raised to the power of y
RADIANS(n)	Converts degrees to radians
RAND()	Returns a random number between 0 and 1

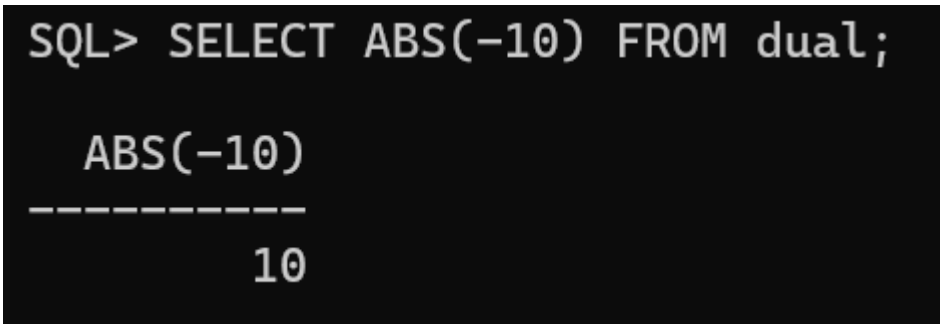
ROUND(n, d)	Rounds `n` to `d` decimal places
SIGN(n)	Returns `-1`, `0`, or `1` depending on the sign of `n`
SIN(n)	Returns the sine of `n` (in radians)
SQRT(n)	Returns the square root of `n`
SQUARE(n)	Returns the square of `n` (same as `POWER(n, 2)`)

SUM(expression)	Returns the sum of a set of values
TAN(n)	Returns the tangent of `n` (in radians)

2. Examples in SQL*Plus (Oracle) /skip if you want to use mysql platform

2.1 Absolute Value (ABS)

```
SELECT ABS(-10) FROM dual; -- Result: 10
```



2.2 Arc Cosine (ACOS)

```
SELECT ACOS(0.5) FROM dual; -- Result: 1.04719755 (in
radians)
```

```
SQL> SELECT ACOS(0.5) FROM dual;

 ACOS(0.5)
----------
1.04719755
```

2.3 Arc Sine (ASIN)

```
SELECT ASIN(0.5) FROM dual; -- Result: 0.523598775 (in
radians)
```

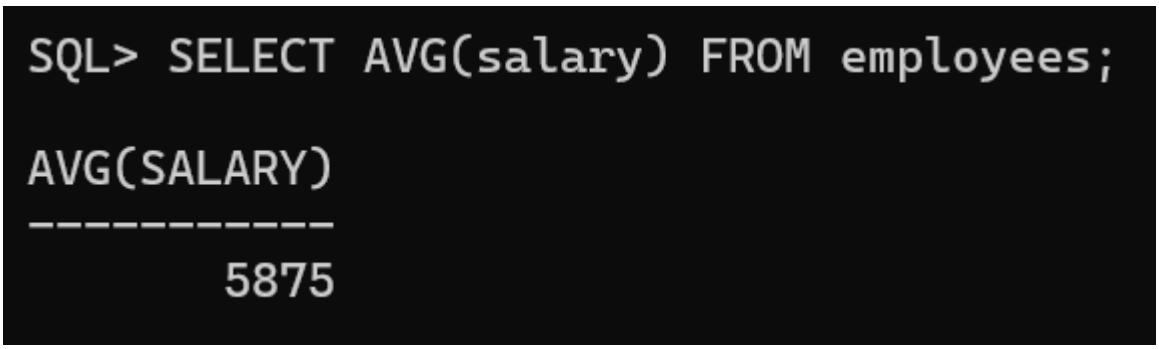
```
SQL> SELECT ASIN(0.5) FROM dual;

 ASIN(0.5)
----------
.523598776
```

2.4 Arc Tangent (ATAN)

```
SELECT ATAN(1) FROM dual; -- Result: 0.785398163 (in
radians)
```

2.5 Average (AVG)

```
SELECT AVG(salary) FROM employees; -- Finds the average
salary
```



2.6 Ceiling (CEILING)

```
SELECT CEIL(4.2) FROM dual; -- Result: 5
```

```
SQL> SELECT CEIL(4.2) FROM dual;

 CEIL(4.2)
----------
         5
```

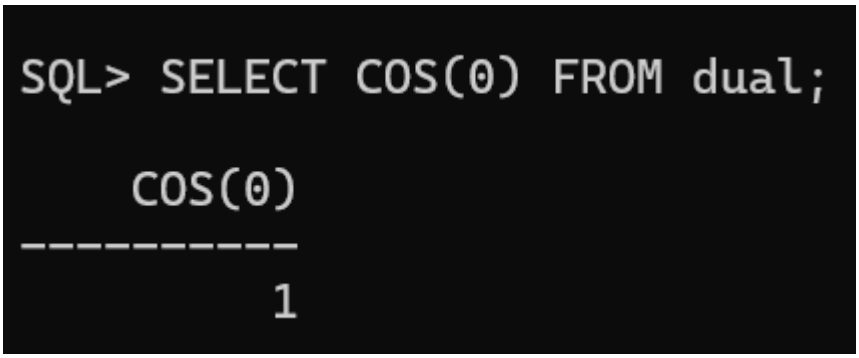
2.7 Count (COUNT)

```
SELECT COUNT(*) FROM employees WHERE department =
'Sales'; -- Counts employees in Sales
```

```
SQL> SELECT COUNT(*) FROM employees WHERE department = 'Sales';

  COUNT(*)
----------
         2
```

2.8 Cosine (COS)

```
SELECT COS(0) FROM dual; -- Result: 1
```



2.9 Cotangent (COT)

```
SELECT 1/TAN(PI()/4) FROM dual; -- Result: 1
```

2.10 Convert Radians to Degrees (DEGREES)

```
SELECT DEGREES(PI()/2) FROM dual; -- Result: 90
```

2.11 Exponential (EXP)

```
SELECT EXP(2) FROM dual; -- Result: 7.389056099
```

```
SQL> SELECT EXP(2) FROM dual;

    EXP(2)
----------
 7.3890561
```

2.12 Floor (FLOOR)

```
SELECT FLOOR(4.8) FROM dual; -- Result: 4
```

```
SQL> SELECT FLOOR(4.8) FROM dual;

FLOOR(4.8)
----------
         4
```

2.13 Natural Logarithm (LOG)

```
SELECT LOG(2.718281828) FROM dual; -- Result: 1 (since
e^1 = e)
```

2.14 Logarithm Base 10 (LOG10)

```
SELECT LOG(10, 100) FROM dual; -- Result: 2 (since 10^2 =
100)
```

2.15 Maximum (MAX)

```
SELECT MAX(salary) FROM employees; -- Finds the highest
salary
```

```
SQL> SELECT MAX(salary) FROM employees;

MAX(SALARY)
-----------
       7000
```

2.16 Minimum (MIN)

```
SELECT MIN(salary) FROM employees; -- Finds the lowest
salary
```

```
SQL> SELECT MIN(salary) FROM employees;

MIN(SALARY)
-----------
        5000
```

2.17 Pi (PI)

```
SELECT ACOS(-1) FROM dual; -- Result: 3.14159265
```

```
SQL> SELECT ACOS(-1) FROM dual;

  ACOS(-1)
----------
3.14159265
```

2.18 Power (POWER)

```
SELECT POWER(3, 2) FROM dual; -- Result: 9
```

```
SQL> SELECT POWER(3, 2) FROM dual;

POWER(3,2)
----------
         9
```

2.19 Convert Degrees to Radians (RADIANS)

```
SELECT RADIANS(180) FROM dual; -- Result: 3.14159265
```

2.20 Random Number (RAND)

```
SELECT DBMS_RANDOM.VALUE FROM dual; -- Returns a random
number between 0 and 1
```

```
SQL> SELECT DBMS_RANDOM.VALUE FROM dual;

     VALUE
----------
.593581478
```

2.21 Round Number (ROUND)

```
SELECT ROUND(3.14159265, 2) FROM dual; -- Result: 3.14
```

```
SQL> SELECT ROUND(3.14159265, 2) FROM dual;

ROUND(3.14159265,2)
-------------------
               3.14
```

2.22 Sign of Number (SIGN)

```
SELECT SIGN(-10) FROM dual; -- Result: -1
SELECT SIGN(0) FROM dual; -- Result: 0
SELECT SIGN(10) FROM dual; -- Result: 1
```

```
SQL> SELECT SIGN(-10) FROM dual;

 SIGN(-10)
----------
        -1
```

```
SQL> SELECT SIGN(0) FROM dual;

   SIGN(0)
----------
         0

SQL> SELECT SIGN(10) FROM dual;

  SIGN(10)
----------
         1
```

2.23 Sine (SIN)

```
SELECT SIN(PI()/2) FROM dual; -- Result: 1
```

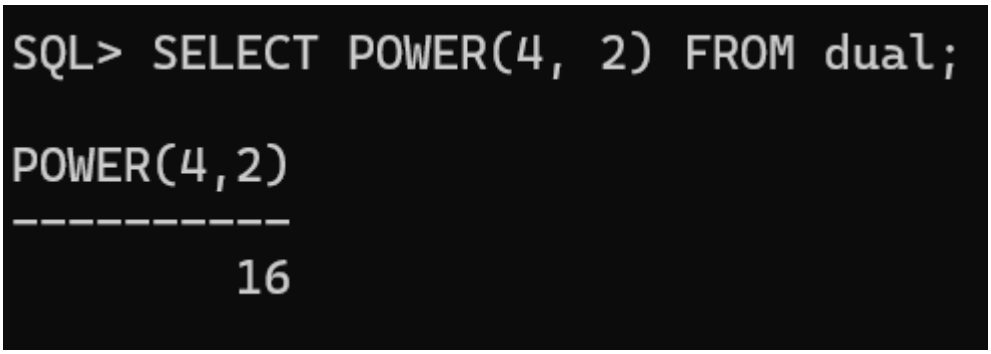
2.24 Square Root (SQRT)

```
SELECT SQRT(16) FROM dual; -- Result: 4
```

```
SQL> SELECT SQRT(16) FROM dual;

  SQRT(16)
----------
         4
```

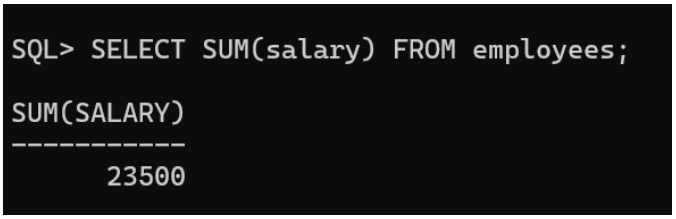
2.25 Square (SQUARE)

```
SELECT POWER(4, 2) FROM dual; -- Result: 16
```



2.26 Sum (SUM)

```
SELECT SUM(salary) FROM employees; -- Sum of all salaries
```



2.27 Tangent (TAN)

```
SELECT TAN(PI()/4) FROM dual; -- Result: 1
```