

# Chapter 10 : SQL Functions

## Functions

A function is a predefined command set that performs some operation and returns the single value.

### Numeric Functions

**POWER()** : Returns the argument raised to the specified power. POW () works the same way.

**Example:**

- (i) POW(2,4): Result:16
- (ii) POW(2,- 2): Result: 0.25
- (iii) POW(-2,3): Result: -8

**ROUND()** : ROUND(X) Rounds the argument to the zero decimal place, Whereas ROUND(X,d) rounds the argument to d decimal places.

**Example :**

- (i) ROUND(-1.23); Result: -1
- (ii) ROUND(-1.58); Result: -2
- (iii) ROUND(1.58); Result: 2
- (iv) ROUND(3.798, 1); Result: 3.8
- (v) ROUND(1.298, 0); Result: 1
- (vi) ROUND(23.298, -1); Result: 20
- (vii) ROUND( 25.298,-1); result: 30

**TRUNCATE()** : Truncates the argument to specified number of decimal places.

**Example:**

- (i) TRUNCATE (7.29,1) Result: 7.2
- (ii) TRUNCATE(27.29,-1) Result: 20

**SIGN()** : Returns sign of a given number.

**Example :**

- (i) SIGN (15) Result : 1 :
- (ii) SIGN (-15) Result : -1 :
- (iii) SIGN (0) Result : 0.

**SQRT** : Returns the square root of given number.

**Example :**

- (i) SQRT (25) Result : 5

What is SQL?

**Ans.** SQL is Non-procedural universal data access language used to access and manipulate data stored in nearly all the data bases available currently. SQL standards are defined by ANSI (American National Standards Institute). SQL statements are used to retrieve and update data in a database. SQL works with database programs like MySQL, MS Access, DB2, Informix, MS SQL Server, Oracle, Sybase, etc.

Differentiate between DDL and DML?

**Ans.** Data Definition Language (DDL): This is a category of SQL commands. All the commands which are used to create, destroy, or restructure databases and tables come under this category. Examples of DDL commands are - CREATE, DROP, ALTER. Data Manipulation Language (DML): This is a category of SQL commands. All the commands which are used to manipulate data within tables come under this category. Examples of DML commands are - INSERT, UPDATE, DELETE.

What is a constraint?

**Ans.** : A constraints is a condition or check application on a field or set of fields. Example: NOT NULL (ensure that column can not have null value), CHECK (make sure that all value satisfy certain criteria), UNIQUE (ensure that all values in a column are different) etc.

What are single row functions ?

**Ans.** : Single Row Function work with a single row at a time. A single row function returns a result for every row of a quired table Examples of Single row functions are Sqrt(), Concat(), Lcase(), Upper(), Day(), etc. Compare CHAR and VARCHAR data types.

**Ans.** The CHAR data-type stores fixed length strings such that strings having length smaller than the field size are padded on the right with spaces before being stored. The VARCHAR on the other hand supports variable length strings and therefore stores strings smaller than the field size without modification.

What are the differences between DELETE and DROP commands of SQL?

**Ans.** : DELETE is DML command while DROP is a DDL command. Delete is used to delete rows from a table while DROP is used to remove the entire table from the database.

What do you understand by MySQL Client?

**Ans.** : MySQL Clients are programs that connect to MySQL Server and issue queries in predefined format. Explain with the help of an example that why should a transaction be executed as a whole or it should be not executed at all.

**Ans.** : Suppose Raunak's account number is 3246 and his aunt's account number is 5135. In order to process the cheque presented by Raunak, the following two SQL commands need to be executed on the database maintained by the bank:

UPDATE Savings SET balance = balance - 2000

WHERE account\_no = 5135;

UPDATE Savings SET balance = balance + 2000

WHERE account\_no = 3246;

#### Query Based question & answers

1. The Pincode column of table 'Post' is given below-

**Ans.** : SELECT Pincode from Post where Pincode LIKE " %1" ;

i. SELECT Pincode from Post where Pincode LIKE " 0%" ; i) 110001 ii) No Output

2. A table "Animals" in a database has 3 columns and 10 records. What is the degree and rdinality of this table?

**Ans.** : Degree 3 and Cardinality=10 3. Answer the question based on the table VOTER given below:

(i) Write the command to delete all the rows of particular voter from the table voter where voter ID between 10 and 20.

**Ans.** : Delete from VOTER where V\_id between 10 and 20; (ii) Delete the table physically.

4. Write MySql command to create a furniture table including all constraint.

**Ans.** : Drop table VOTER;

**CREATE TABLE FURNITURE ( ITEMNO INT(5) PRIMARY KEY,  
ITEMNAME VARCHAR(20) NOT NULL, TYPE VARCHAR(20),  
DATE\_STOCK DATE DEFAULT '2012/03/19', PRICE INT(6), DISCOUNT INT(2) );**

5. Consider a database LO

**Ans.** with the following table:

Answer the following questions. Create Database and use it

1. Create the database LO

**Ans.**

**MySql>** Create Database LO

**Ans.** ;

2. Use the database LO

**Ans.** .

**MySql>** Use LO

**Ans.** ; Create Table / Insert Into

3. Create the table Loan\_Accounts and insert tuples in it.

**MySql>**Create table Loan\_Acc

(AccNo int primary key, Cust\_Name varchar(30),

Loan\_Amount int, Installment int, Int\_Rate number(5,3),

Start\_Date date, Interest number(7,2));

**MySql>** Insert into Loan\_Acc values(1,'R.K. GUPTA',300000,36,12.0,'2009-07-19');

Simple Select

4. Display the details of all the lo

**Ans.** .

**MySql>** Select \* from Loan\_Acc;

5. Display the AccNo, Cust\_Name, and Loan\_Amount of all the lo

**Ans.** .

**MySql>** Select Acc\_No,Cust\_Name,Loan\_Amount from Loan\_Acc;

#### Conditional Select using Where Clause

6 Display the details of all the lo

**Ans.** with less than 40 instalments.

**MySql>** Select \* from Loan\_Acc where Instalment <40;

7. Display the AccNo and Loan\_Amount of all the lo

**Ans.** started before 01-04-2009.

**Mysql>** Select AccNo, Loan\_Amount from Loan\_Acc where Start\_Date <'2009-04-01'; 8.

8. Display the Int\_Rate of all the lo

**Ans.** started after 01-04-2009.

**Mysql>** Select Int\_Rate from Loan\_Acc where Start\_date>'2009-04-01'; Using NULL

9. Display the details of all the lo

**Ans.** whose rate of interest is NULL.

**Mysql>** Select \* from Loan\_Acc where Int\_rate is NULL;

10. Display the details of all the lo

**Ans.** whose rate of interest is not NULL.

**Mysql>** Select \* from Loan\_Acc where Int\_rate is not NULL;

#### **Using DISTINCT Clause**

11. Display the amounts of various lo

**Ans.** from the table Loan\_Accounts. A loan amount should appear only once.

**Mysql>** Select DISTINCT Loan\_Amount from Loan\_Acc;

12. Display the number of instalments of various lo

**Ans.** from the table Loan\_Accounts. An instalment should appear only once.

**Mysql>** Select DISTINCT Instalment from Loan\_Acc;

#### **Using Logical Operators (NOT, AND, OR)**

13. Display the details of all the lo

**Ans.** started after 31-12-2008 for which the number of instalments are more than 36.

**Mysql>** Select \* from Loan\_Acc where Start\_Date>'2008-12-31' and Instalment>36;

14. Display the Cust\_Name and Loan\_Amount for all the lo

**Ans.** which do not have number of instalments 36.

**Mysql>** Select Cust\_Name, Loan\_Amount from Loan\_Acc where Instalment <>36;

15. Display the Cust\_Name and Loan\_Amount for all the lo

**Ans.** for which the loan amount is less than 500000 or int\_rate is more than 12.

**Mysql>** Select Cust\_Name, Loan\_Amount from Loan\_Acc where Loan\_Amount <500000 or Int\_rate>12;

16. Display the details of all the lo

**Ans.** which started in the year 2009.

**Mysql>** Select \* from Loan\_Acc where Year(Start\_Date)=2009;

17. Display the details of all the lo

**Ans.** whose Loan\_Amount is in the range 400000 to 500000.

**Mysql>** Select \* from Loan\_Acc where Loan\_Amount between 400000 and 500000;

18. Display the details of all the lo

**Ans.** whose rate of interest is in the range 11% to 12%.

**Mysql>** Select \* from Loan\_Acc where Int\_Rate between 11 and 12; Using IN Operator

19. Display the Cust\_Name and Loan\_Amount for all the lo

**Ans.** for which the number of instalments are 24, 36, or 48 (Using IN operator)

**Mysql>** Select Cust\_Name, Loan\_Amount from Loan\_Acc where Instalment IN(24,36,48); UR  
Using LIKE Operator

20. Display the AccNo, Cust\_Name, and Loan\_Amount for all the lo

**Ans.** for which the Cust\_Name ends with 'Sharma'.

**Mysql>** Select AccNo, Cust\_name from Loan\_Acc where Cust\_Name like '%Sharma';

21. Display the AccNo, Cust\_Name, and Loan\_Amount for all the lo

**Ans.** for which the Cust\_Name ends with 'a'.

**Mysql>** Select AccNo, Cust\_name, Loan\_Amount from Loan\_Acc where Cust\_Name like '%a';

22. Display the AccNo, Cust\_Name, and Loan\_Amount for all the lo

**Ans.** for which the Cust\_Name contains 'a'

**Mysql>** Select AccNo, Cust\_name, Loan\_Amount from Loan\_Acc where Cust\_Name like '%a%';  
Using ORDER BY clause

23. Display the details of all the lo

**Ans.** in the ascending order of their Loan\_Amount.

**Mysql>** Select \* from Loan\_Acc ORDER BY Loan\_Amount;

28. Display the details of all the lo

**Ans.** in the descending order of their Start\_Date.

**Mysql>** Select \* from Loan\_Acc ORDER BY Start\_date DESC;  
Using UPDATE, DELETE, ALTER TABLE

29. Put the interest rate 11.50% for all the lo

**Ans.** for which interest rate is NULL.

**Mysql>** Update Loan\_Acc SET Int\_Rate =11.50 Where Int\_Rate IS NULL:

30. Delete the records of all the lo

**Ans.** of 'K.P. Jain'

**Mysql>** Delete From Loan\_Acc Where Cust\_Name='K.P.Jain';

31. Add another column Category of type CHAR(1) in the Loan table.

**Mysql>** Alter Table Loan\_Acc ADD (Category CHAR(1) );

SQL PRACTICAL ASSIGNMENT

**Lab Activity 1:** Create a table STUDENT with under mentioned structure by using SQL Statement:

**Step 1:** Open MySQL, Open Database and create table as:

CREATE TABLE Student ( StdID INT(4) PRIMARY KEY, StdName VARCHAR(30) NOT NULL,

Sex VARCHAR(1), Percentage DECIMAL(5,2), SClass INT ,

Sec VARCHAR(1), Stream VARCHAR(10), DOB DATE );

**Step 2:** Press Enter key to complete create table:

**Step 3:** Insert records into STUDENT table.

INSERT INTO Student VALUES (1001, 'AKSHRA AGARWAL','FEMALE',70.11,'A', '10/11/1996');

**Step 4:** As you press enter key after typing above statement, 1 record will be stored into STUDENT table.

**Step 5:** Similarly like step 3, enter other records of the following table.

**Lab Activity 2:** Open school database, then select student table and use following SQL statements.

**TYPE THE STATEMENT, PRESS ENTER AND NOTE THE OUTPUT**

1.To display all the records form STUDENT table.

SELECT \* FROM student ;

2. To display ony name and date of birth from the table STUDENT.

SELECT StdName, DOB FROM student ;\

3. To display all students record where percentage is greater of equal to 80 FROM student table.

SELECT \* FROM student WHERE percentage >= 80;

4. To display student name, stream and percentage where percentage of student is more than

80SELECT StdName, Stream, Percentage WHERE percentage > 80;

5. To display all records of science students whose percentage is more than 75 form student table.

SELECT \* FORM student WHERE stream = 'Science' AND percentage > 75;

**Lab Activity 3:** Open school database, then select student table and use following SQL statements

### TYPE THE STATEMENT, PRESS ENTER AND NOTE THE OUTPUT

1. To display the STUDENT table structure.

```
DESCRIBE Student;
```

2. To add a column (FIELD) in the STUDENT table, for example TeacherID as VARCHAR(20);

```
ALTER TABLE Student ADD TeacherID VARCHAR(20);
```

3. Type the statement

```
DESC Student;
```

Press enter key, now note the difference in table structure.

4. Type the statement and press enter key, note the new field that you have added as TeacherID

```
SELECT * FROM student;
```

5. To modify the TeacherID data type from character to integer.

```
ALTER TABLE Student MODIFY TeacherID INTEGER ;
```

```
DESC Student;
```

```
SELECT * FROM student;
```

#### Lab Activity 4

1. To Drop (Delete) a field from a table. For e.g you want to delete TeacherID field.

```
ALTER TABLE Student DROP Teacher ID;
```

2. To subtract 5 from all students percentage and display name and percentage.

```
SELECT name, percentage - 5 FROM Student;
```

3. Using column alias for example we want to display StdName as Student Name and DOB as Date of Birth then the statement will be.

```
SELECT StdName AS "Student Name",
```

```
DOB As "Date of Birth" FROM Student;
```

4. Display the name of all students whose stream is not Science

```
SELECT StdName FROM student
```

```
WHERE Stream <> 'Science';
```

5. Display all name and percentage where percentage is between 60 and 80

```
SELECT StdName, percentage FROM student WHERE percentage >=60 AND  
percentage<=80 ;
```

#### Lab Activity 5:

1. To change a student name from SWATI MISHRA to SWATI VERMA whose StdID is 1014 and also change percentage 86.

```
UPDATE Student SET StdName = 'SWATI VERMA', percentage = 86 WHERE StdId = 1014;
```

2. To delete the records from student table where StdId is 1016.

```
DELETE FROM Student WHERE StdID = 1016;
```

3. Type the following SQL statement and note the output.

```
SELECT * FROM Student WHERE StdName LIKE 'G_';
```

```
SELECT * FROM Student WHERE StdName='G';
```

```
SELECT * FROM Student WHERE StdName LIKE 'G%';
```

```
SELECT * FROM Student WHERE StdName='%G%';
```

4. Display all the streams in student table.

```
SELECT DISTINCT Stream FROM Student;
```

5. Note the output of the following statement.

```
SELECT StdName, Sex, Stream FROM Student WHERE percentage BETWEEN 70 AND 80;
```

1. Consider the Empl table and write SQL command to get the following.

a. Write a query to display EName and Sal of employees whose salary are greater than or equal to 2200?

b. Write a query to display details of employees who are not getting commission?

c. Write a query to display employee name and salary of those employees who don't have their salary in range of 2500 to 4000?

d. Write a query to display the name, job title and salary of employees who don't have manager?

e. Write a query to display the name of employee whose name contains "A" as third alphabet?

f. Write a query to display the name of employee whose name contains "T" as last alphabet?

g. Write a query to display the name of employee whose name contains "M" as First and "L" as third alphabet?

h. Write a query to display details of employees with the text "Not given", if commission is null?