Oracle SQL Functions

Oracle SQL Date-Time Functions:

1. Current Date & Time Functions:

Function	Description	Example	Output
Current Date & Time Functions			
`SYSDATE`	Returns the current system date and time.	`SELECT SYSDATE FROM DUAL;`	`11-MAR-25 10:30:45`
`CURRENT_DATE`	Returns the current date and time in the session's time zone.	`SELECT CURRENT_DATE FROM DUAL;`	`11-MAR-25 10:30:45`
`SYSTIMESTAMP`	Returns the system date and time, including fractional seconds and time zone.	`SELECT SYSTIMESTAMP FROM DUAL;`	`11-MAR-25 10:30:45.123456 AM +05:30`
`CURRENT_TIMESTAMP`	Returns the current timestamp in the session's time zone.	`SELECT CURRENT_TIMESTAMP FROM DUAL;`	`11-MAR-25 10:30:45.123456 AM +05:30`
`LOCALTIMESTAMP`	Returns the current date and time without time zone information.	`SELECT LOCALTIMESTAMP FROM DUAL;`	`11-MAR-25 10:30:45.123456`
`DBTIMEZONE`	Returns the database time zone.	`SELECT DBTIMEZONE FROM DUAL;`	`+00:00`
`SESSIONTIMEZONE`	Returns the session time zone.	`SELECT SESSIONTIMEZONE FROM DUAL;`	`+05:30`
`TZ_OFFSET`	Returns the offset of a time zone.	`SELECT TZ_OFFSET('Asia/Kolkata') FROM DUAL;`	`+05:30`

2. Date Extraction Functions:

`EXTRACT`	Extracts specific parts of a date (YEAR, MONTH, DAY, etc.).	`SELECT EXTRACT(YEAR FROM SYSDATE) FROM DUAL;`	`2025`
`TO_CHAR`	Converts date to a formatted string.	`SELECT TO_CHAR(SYSDATE, 'YYYY-MM-DD HH24:MI:SS') FROM DUAL;`	`2025-03-11 10:30:45`
`TO_DATE`	Converts a string to a date.	`SELECT TO_DATE('2025-03-11', 'YYYY-MM-DD') FROM DUAL;`	`11-MAR-25`
`TO_TIMESTAMP`	Converts a string to a timestamp.	`SELECT TO_TIMESTAMP('2025-03-11 10:30:45', 'YYYY-MM-DD HH24:MI:SS') FROM DUAL;`	`11-MAR-25 10:30:45.000000`
`TO_TIMESTAMP_TZ`	Converts a string to a timestamp with time zone.	`SELECT TO_TIMESTAMP_TZ('2025-03-11 10:30:45 +05:30', 'YYYY-MM-DD HH24:MI:SS TZH:TZM') FROM DUAL;`	`11-MAR-25 10:30:45.000000 +05:30`
`FROM_TZ`	Converts a timestamp to a time zone.	`SELECT FROM_TZ(TIMESTAMP '2025-03-11 10:30:45', 'Asia/Kolkata') FROM DUAL;`	`11-MAR-25 10:30:45.000000 Asia/Kolkata`

3. Date Arithmetic Functions:

`ADD_MONTHS`	Adds or subtracts months from a date.	`SELECT ADD_MONTHS(SYSDATE, 3) FROM DUAL;`	`11-JUN-25`
`MONTHS_BETWEEN`	Returns the number of months between two dates.	`SELECT MONTHS_BETWEEN(TO_DATE('2025-06-11', 'YYYY-MM-DD'), SYSDATE) FROM DUAL;`	`3.0`
`NEXT_DAY`	Returns the next occurrence of a specific weekday.	`SELECT NEXT_DAY(SYSDATE, 'SUNDAY') FROM DUAL;`	`16-MAR-25`
`LAST_DAY`	Returns the last day of the month for a given date.	`SELECT LAST_DAY(SYSDATE) FROM DUAL;`	`31-MAR-25`
`TRUNC`	Truncates a date to a specific unit (day, month, year).	`SELECT TRUNC(SYSDATE, 'MONTH') FROM DUAL;`	`01-MAR-25`
`ROUND`	Rounds a date to the nearest unit (day, month, year).	`SELECT ROUND(SYSDATE, 'MONTH') FROM DUAL;`	`01-APR-25`

`NUMTODSINTERVAL`	Converts a number to an INTERVAL DAY TO SECOND type.	`SELECT NUMTODSINTERVAL(2, 'DAY') FROM DUAL;`	`+02 00:00:00.000000`
`NUMTOYMINTERVAL`	Converts a number to an INTERVAL YEAR TO MONTH type.	`SELECT NUMTOYMINTERVAL(2, 'YEAR') FROM DUAL;`	`+02-00`
`INTERVAL`	Used for time calculations in days, hours, minutes, etc.	`SELECT SYSTIMESTAMP + INTERVAL '2' DAY FROM DUAL;`	`13-MAR-25 10:30:45.123456`

4. Time Zone Conversion Functions:

`NEW_TIME`	Converts a date from one time zone to another.	`SELECT NEW_TIME(SYSDATE, 'GMT', 'PST') FROM DUAL;`	`10-MAR-25 22:30:45`
`SYS_EXTRACT_UTC`	Converts a timestamp to UTC time zone.	`SELECT SYS_EXTRACT_UTC(SYSTIMESTAMP) FROM DUAL;`	`11-MAR-25 05:00:45.123456`
`CAST`	Converts a DATE to a TIMESTAMP or vice versa.	`SELECT CAST(SYSDATE AS TIMESTAMP) FROM DUAL;`	`11-MAR-25 10:30:45.000000`

5. Conversion between Daye and Timestamp:

`TO_DSINTERVAL`	Converts a string to an INTERVAL DAY TO SECOND type.	`SELECT TO_DSINTERVAL('3 12:30:00') FROM DUAL;`	`+03 12:30:00.000000`
`TO_YMINTERVAL`	Converts a string to an INTERVAL YEAR TO MONTH type.	`SELECT TO_YMINTERVAL('2-6') FROM DUAL;`	`+02-06`

Oracle SQL Mathematical Functions:

1. Basic Arithmetic Operators

Operator	Description	Example	Output
`+`	Addition	`SELECT 10 + 5 FROM DUAL;`	`15`
`-`	Subtraction	`SELECT 10 - 5 FROM DUAL;`	`5`
`*`	Multiplication	`SELECT 10 * 5 FROM DUAL;`	`50`
`/`	Division	`SELECT 10 / 5 FROM DUAL;`	`2`
`MOD(n, m)`	Modulus (remainder of division)	`SELECT MOD(10, 3) FROM DUAL;`	`1`

2. Numeric Functions

Function	Description	Example	Output
`ABS(n)`	Absolute value	`SELECT ABS(-10) FROM DUAL;`	`10`
`CEIL(n)`	Smallest integer greater than or equal to `n`	`SELECT CEIL(4.2) FROM DUAL;`	`5`
`FLOOR(n)`	Largest integer less than or equal to `n`	`SELECT FLOOR(4.9) FROM DUAL;`	`4`
`ROUND(n, d)`	Rounds `n` to `d` decimal places	`SELECT ROUND(12.3456, 2) FROM DUAL;`	`12.35`
`TRUNC(n, d)`	Truncates `n` to `d` decimal places	`SELECT TRUNC(12.3456, 2) FROM DUAL;`	`12.34`
`SIGN(n)`	Returns `-1`, `0`, or `1` depending on the sign of `n`	`SELECT SIGN(-10) FROM DUAL;`	`-1`

3. Power and Logarithm Functions

Function	Description	Example	Output
`POWER(n, m)`	`n` raised to the power `m`	`SELECT POWER(2, 3) FROM DUAL;`	`8`
`SQRT(n)`	Square root of `n`	`SELECT SQRT(25) FROM DUAL;`	`5`
`EXP(n)`	Exponential (e^n)	`SELECT EXP(1) FROM DUAL;`	`2.718...`
`LN(n)`	Natural logarithm (base e) of `n`	`SELECT LN(10) FROM DUAL;`	`2.302...`
`LOG(m, n)`	Logarithm of `n` to base `m`	`SELECT LOG(10, 1000) FROM DUAL;`	`3`

4. Trigonometric Functions

Function	Description	Example	Output
`SIN(n)`	Sine of `n` (radians)	`SELECT SIN(PI()/2) FROM DUAL;`	`1`
`COS(n)`	Cosine of `n` (radians)	`SELECT COS(PI()) FROM DUAL;`	`-1`
`TAN(n)`	Tangent of `n` (radians)	`SELECT TAN(PI()/4) FROM DUAL;`	`1`
`ASIN(n)`	Arc sine of `n`	`SELECT ASIN(1) FROM DUAL;`	`1.5708`
`ACOS(n)`	Arc cosine of `n`	`SELECT ACOS(1) FROM DUAL;`	`0`
`ATAN(n)`	Arc tangent of `n`	`SELECT ATAN(1) FROM DUAL;`	`0.7854`
`ATAN2(y, x)`	Arc tangent of `y/x`	`SELECT ATAN2(1, 1) FROM DUAL;`	`0.7854`

6. Aggregate Functions

Function	Description	Example	Output
`SUM(n)`	Sum of column values	`SELECT SUM(salary) FROM employees;`	`500000`
`AVG(n)`	Average of column values	`SELECT AVG(salary) FROM employees;`	`50000`
`MIN(n)`	Minimum value	`SELECT MIN(salary) FROM employees;`	`20000`
`MAX(n)`	Maximum value	`SELECT MAX(salary) FROM employees;`	`120000`
`COUNT(n)`	Number of rows	`SELECT COUNT(*) FROM employees;`	`100`

4. Trigonometric Functions

Function	Description	Example
`SIN(n)`	Returns the sine of `n` (in radians).	`SELECT SIN(PI()/2) FROM DUAL;` → **1**
`COS(n)`	Returns the cosine of `n` (in radians).	`SELECT COS(PI()) FROM DUAL;` → **-1**
`TAN(n)`	Returns the tangent of `n` (in radians).	`SELECT TAN(PI()/4) FROM DUAL;` → **1**
`ASIN(n)`	Returns the arcsine of `n` (in radians).	`SELECT ASIN(0.5) FROM DUAL;` → **0.5236**
`ACOS(n)`	Returns the arccosine of `n` (in radians).	`SELECT ACOS(0.5) FROM DUAL;` → **1.0472**
`ATAN(n)`	Returns the arctangent of `n` (in radians).	`SELECT ATAN(1) FROM DUAL;` → **0.7854**
`PI()`	Returns the value of π (Pi).	`SELECT PI() FROM DUAL;` → **3.14159**
`DEGREES(n)`	Converts radians to degrees.	`SELECT DEGREES(PI()) FROM DUAL;` → **180**
`RADIANS(n)`	Converts degrees to radians.	`SELECT RADIANS(180) FROM DUAL;` → **3.14159**

7. Bitwise Operators (Starting Oracle 21c)

Operator	Description	Example	Output
`BITAND(n1, n2)`	Bitwise AND	`SELECT BITAND(5, 3) FROM DUAL;`	`1`
`~`	Bitwise NOT	`SELECT ~5 FROM DUAL;`	`-6`

5. Random Number Functions

Function	Description	Example
`DBMS_RANDOM.VALUE()`	Returns a random number between `0` and `1`.	`SELECT DBMS_RANDOM.VALUE() FROM DUAL;`
`DBMS_RANDOM.VALUE(x, y)`	Returns a random number between `x` and `y`.	`SELECT DBMS_RANDOM.VALUE(1, 100) FROM DUAL;`
`DBMS_RANDOM.RANDOM()`	Returns a random integer.	`SELECT DBMS_RANDOM.RANDOM() FROM DUAL;`
`DBMS_RANDOM.NORMAL()`	Returns a normally distributed random number.	`SELECT DBMS_RANDOM.NORMAL FROM DUAL;`

6. Statistical Functions

Function	Description	Example
`AVG(column_name)`	Returns the average of values in a column.	`SELECT AVG(salary) FROM employees;`
`SUM(column_name)`	Returns the sum of values in a column.	`SELECT SUM(salary) FROM employees;`
`MIN(column_name)`	Returns the minimum value in a column.	`SELECT MIN(salary) FROM employees;`
`MAX(column_name)`	Returns the maximum value in a column.	`SELECT MAX(salary) FROM employees;`
`COUNT(column_name)`	Returns the count of non-null values.	`SELECT COUNT(*) FROM employees;`
`STDDEV(column_name)`	Returns the standard deviation of values.	`SELECT STDDEV(salary) FROM employees;`
`VARIANCE(column_name)`	Returns the variance of values.	`SELECT VARIANCE(salary) FROM employees;`

A. Common Uses of DUAL Table

Function	Example
Get the current date and time	`SELECT SYSDATE FROM DUAL;`
Generate a sequence of numbers	`SELECT LEVEL FROM DUAL CONNECT BY LEVEL <= 5;`
Convert a number to a string	`SELECT TO_CHAR(12345, '99999') FROM DUAL;`
Perform arithmetic calculations	`SELECT 10 * 20 FROM DUAL;`
Concatenate strings	`SELECT 'Hello '

Oracle SQL String Functions:

1. Basic String Functions

Function	Description	Example	Output
`LENGTH(string)`	Returns the length of the string	`SELECT LENGTH('Oracle') FROM DUAL;`	`6`
`UPPER(string)`	Converts string to uppercase	`SELECT UPPER('oracle') FROM DUAL;`	`'ORACLE'`
`LOWER(string)`	Converts string to lowercase	`SELECT LOWER('ORACLE') FROM DUAL;`	`'oracle'`
`INITCAP(string)`	Capitalizes the first letter of each word	`SELECT INITCAP('hello world') FROM DUAL;`	`'Hello World'`

2. String Concatenation

Function	Description	Example	Output
`CONCAT(str1, str2)`	Concatenates two strings	`SELECT CONCAT('Hello', 'World') FROM DUAL;`	`'HelloWorld'`
`||`	Concatenates two strings (same as CONCAT)	SELECT 'Oracle' || ' ' || 'SQL' FROM DUAL;	Oracle SQL

3. Trimming and Padding Functions

Function	Description	Example	Output
`TRIM(character FROM string)`	Removes specified character from both ends	`SELECT TRIM('X' FROM 'XHelloX') FROM DUAL;`	`'Hello'`
`LTRIM(string, characters)`	Removes leading characters	`SELECT LTRIM('000123', '0') FROM DUAL;`	`'123'`
`RTRIM(string, characters)`	Removes trailing characters	`SELECT RTRIM('123000', '0') FROM DUAL;`	`'123'`
`LPAD(string, length, pad_char)`	Left-pads string with a character to reach a specific length	`SELECT LPAD('123', 5, '0') FROM DUAL;`	`'00123'`
`RPAD(string, length, pad_char)`	Right-pads string with a character to reach a specific length	`SELECT RPAD('123', 5, '0') FROM DUAL;`	`'12300'`

4. Substring and Positioning Functions

Function	Description	Example	Output
`SUBSTR(string, start, length)`	Extracts substring from a string	`SELECT SUBSTR('OracleSQL', 1, 6) FROM DUAL;`	`'Oracle'`
`INSTR(string, substring, start, occurrence)`	Returns the position of a substring	`SELECT INSTR('Hello World', 'o', 1, 2) FROM DUAL;`	`8`
`REGEXP_INSTR(string, pattern, start, occurrence)`	Returns position of pattern match using regex	`SELECT REGEXP_INSTR('abc123xyz', '[0-9]', 1, 1) FROM DUAL;`	`4`

5. Replace and Formatting Functions

Function	Description	Example	Output
`REPLACE(string, search, replacement)`	Replaces occurrences of `search` with `replacement`	`SELECT REPLACE('Hello World', 'World', 'Oracle') FROM DUAL;`	`'Hello Oracle'`
`TRANSLATE(string, from_chars, to_chars)`	Replaces characters in `from_chars` with corresponding ones in `to_chars`	`SELECT TRANSLATE('123-456', '123', 'ABC') FROM DUAL;`	`'ABC-456'`
`REGEXP_REPLACE(string, pattern, replacement)`	Replaces substrings matching a regex pattern	`SELECT REGEXP_REPLACE('abc123xyz', '[0-9]', '*') FROM DUAL;`	`'abc***xyz'`

6. String Comparison Functions

Function	Description	Example	Output
`ASCII(char)`	Returns ASCII code of a character	`SELECT ASCII('A') FROM DUAL;`	`65`
`CHR(ascii_code)`	Returns character corresponding to ASCII code	`SELECT CHR(65) FROM DUAL;`	`'A'`
`SOUNDEX(string)`	Returns phonetic representation of a string	`SELECT SOUNDEX('Smith') FROM DUAL;`	`'S530'`
`DIFFERENCE(string1, string2)`	Compares phonetic similarity (0-4 scale)	`SELECT DIFFERENCE('Smith', 'Smyth') FROM DUAL;`	`4`

7. Regular Expression Functions

Function	Description	Example	Output
`REGEXP_LIKE(string, pattern)`	Returns `TRUE` if the string matches the regex pattern	`SELECT REGEXP_LIKE('Hello123', '[0-9]') FROM DUAL;`	`TRUE`
`REGEXP_SUBSTR(string, pattern, start, occurrence)`	Returns the substring matching the regex pattern	`SELECT REGEXP_SUBSTR('abc123xyz', '[0-9]+') FROM DUAL;`	`'123'`
`REGEXP_COUNT(string, pattern)`	Counts occurrences of a pattern	`SELECT REGEXP_COUNT('a1b2c3d4', '[0-9]') FROM DUAL;`	`4`

8. String Case and Unicode Functions

Function	Description	Example	Output
`NLS_UPPER(string, language)`	Converts string to uppercase considering locale	`SELECT NLS_UPPER('Straße', 'NLS_SORT=GERMAN') FROM DUAL;`	`'STRASSE'`
`NLS_LOWER(string, language)`	Converts string to lowercase considering locale	`SELECT NLS_LOWER('Straße', 'NLS_SORT=GERMAN') FROM DUAL;`	`'straße'`

9. String Aggregation Functions

Function	Description	Example	Output
`LISTAGG(column, separator) WITHIN GROUP (ORDER BY column)`	Concatenates column values with a separator	`SELECT LISTAGG(name, ', ') WITHIN GROUP (ORDER BY name) FROM employees;`	`'Alice, Bob, Charlie'`
`WM_CONCAT(column)` *(Deprecated)*	Concatenates column values	`SELECT WM_CONCAT(name) FROM employees;`	`'Alice,Bob,Charlie'`

sql

```sql
SELECT 'Oracle' || ' ' || 'SQL' FROM DUAL;
```

CONCATENATED_STRING
Oracle SQL