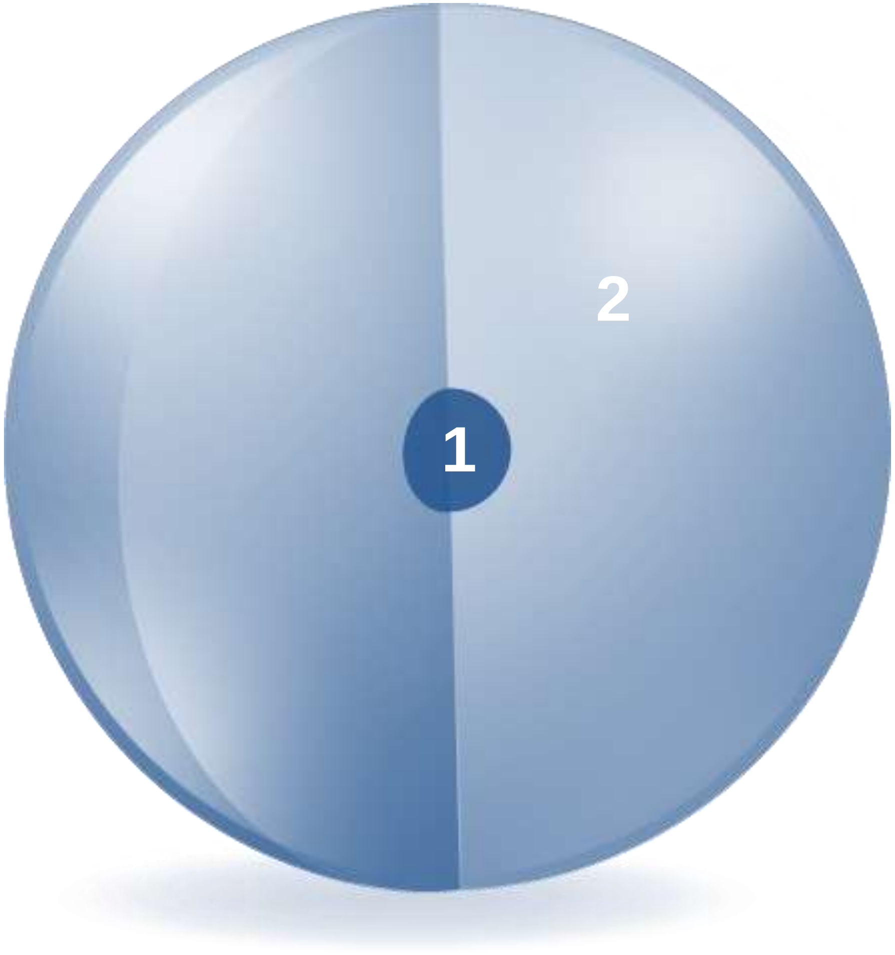
Lesson 2

Using Single-Row Functions to Customize Output

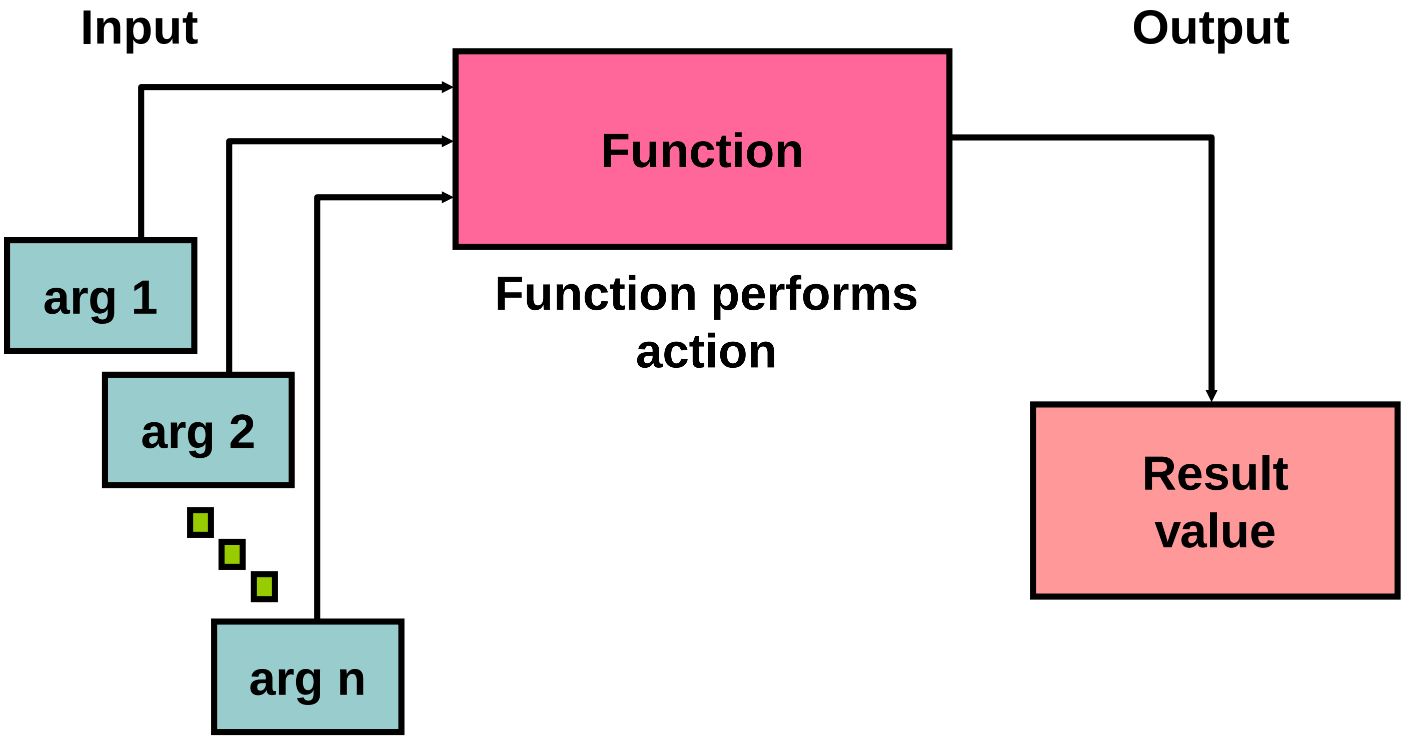
What You will learn at the end of this Session?



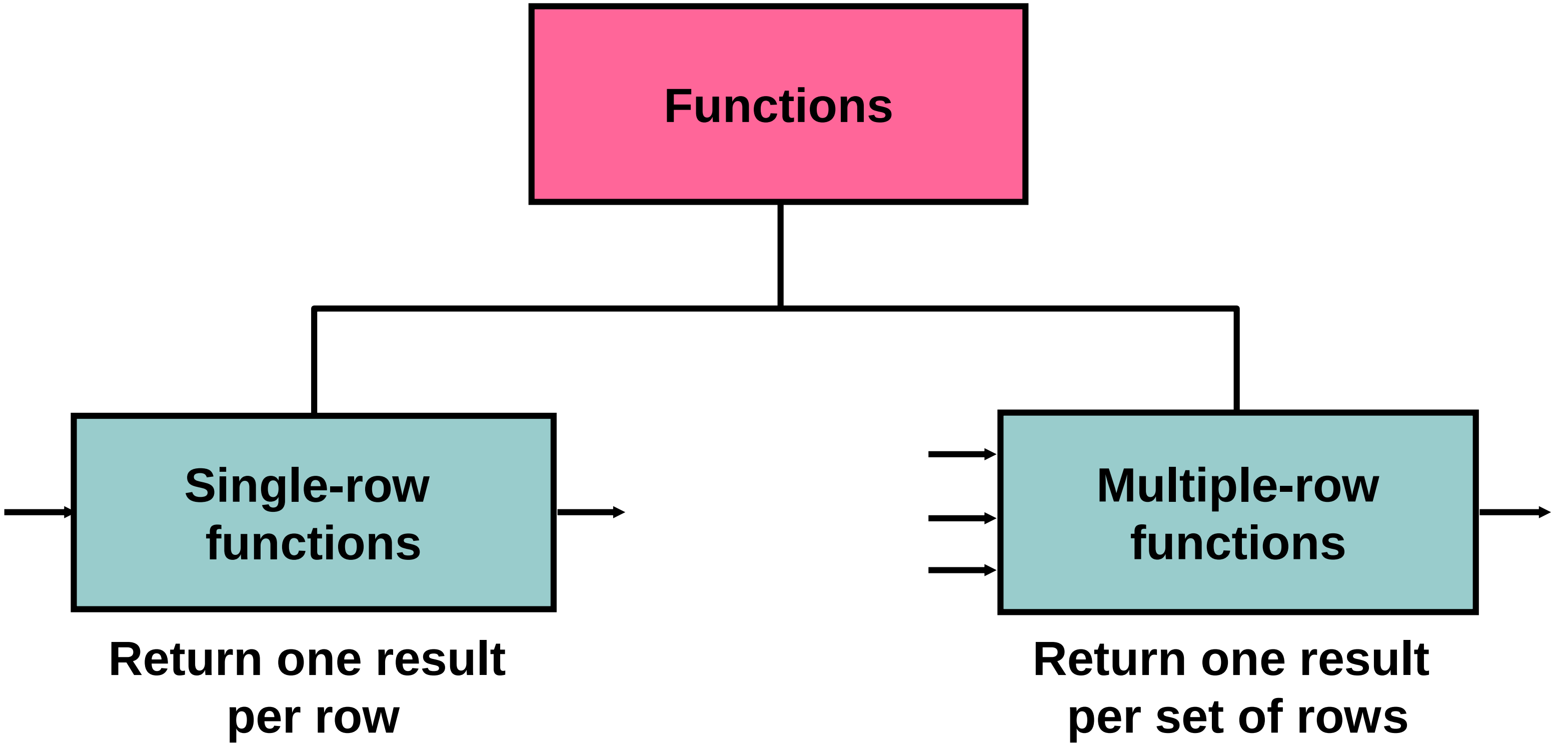
1. **Describe the various types of functions available in SQL**

2. **Use the character, number, and date functions in SELECT statements**

SQL Functions



Two Types of SQL Functions



Single-Row Functions

Manipulate data items

Accept arguments and return one value

Act on each row that is returned

Return one result per row

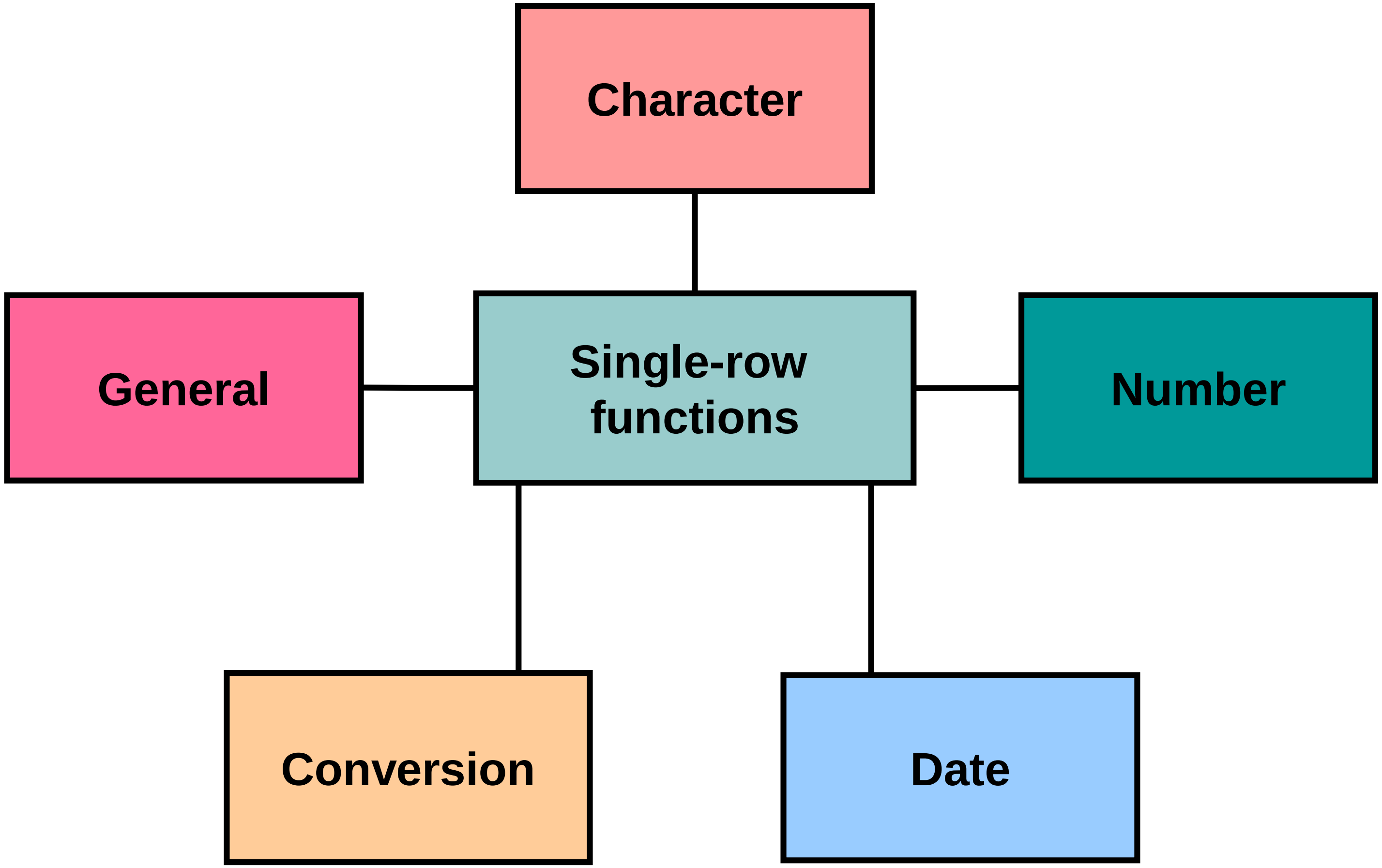
May modify the data type

Can be nested

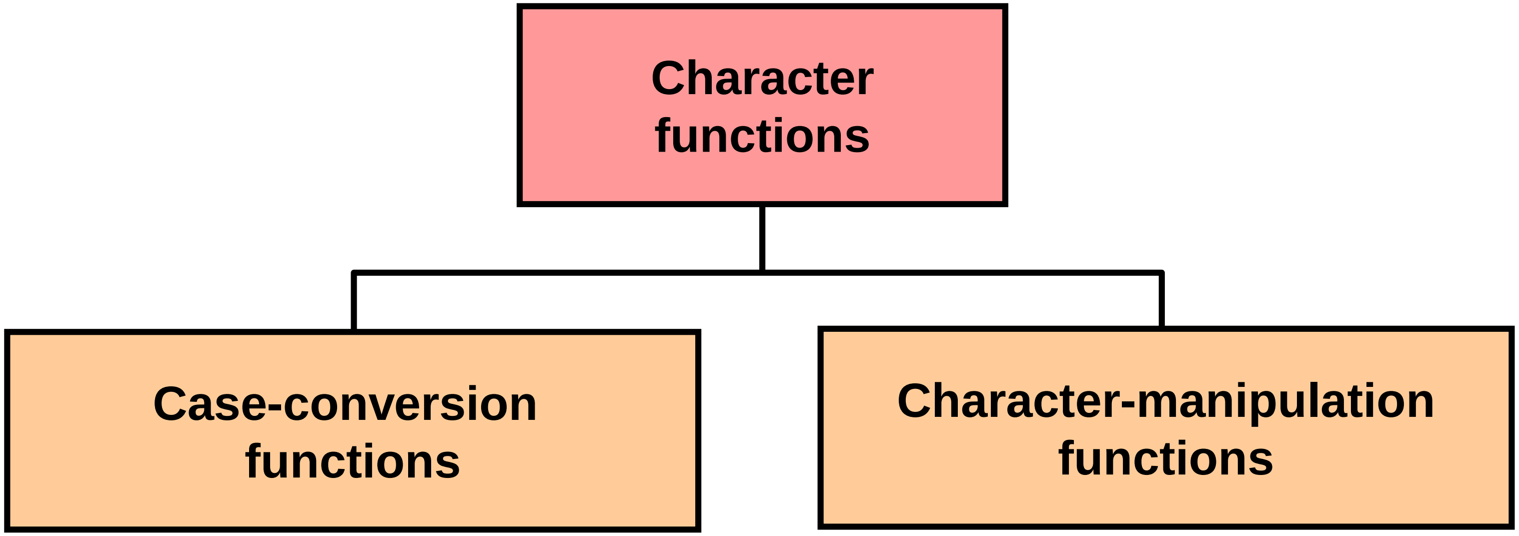
Accept arguments that can be a column or an expression

```
function_name [(arg1, arg2,...)]
```

Single-Row Functions



Character Functions



Character functions

Case-conversion functions

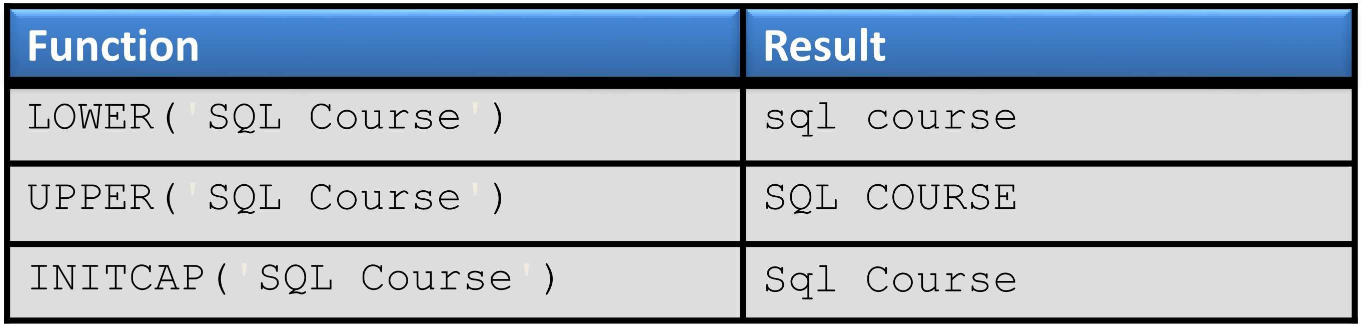
Character-manipulation functions

```
LOWER
UPPER
INITCAP
```

```
CONCAT
SUBSTR
LENGTH
INSTR
LPAD | RPAD
TRIM
REPLACE
```

Case-Conversion Functions

- **These functions convert the case for character strings:**

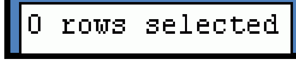


Function	Result
`LOWER('SQL Course')`	`sql course`
`UPPER('SQL Course')`	`SQL COURSE`
`INITCAP('SQL Course')`	`Sql Course`

Using Case-Conversion Functions

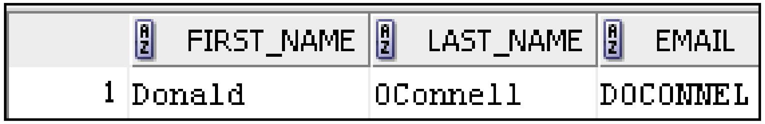
- **Display the first name, last name, and email for customer Donald:**

```
SELECT   first_name,  last_name,  email
FROM   customers
WHERE   first_name  =   'donald';
```



```
0 rows selected
```

```
SELECT   first_name,  last_name,  email
FROM   customers
WHERE   lower(first_name)  =   ' donald ' ;
```



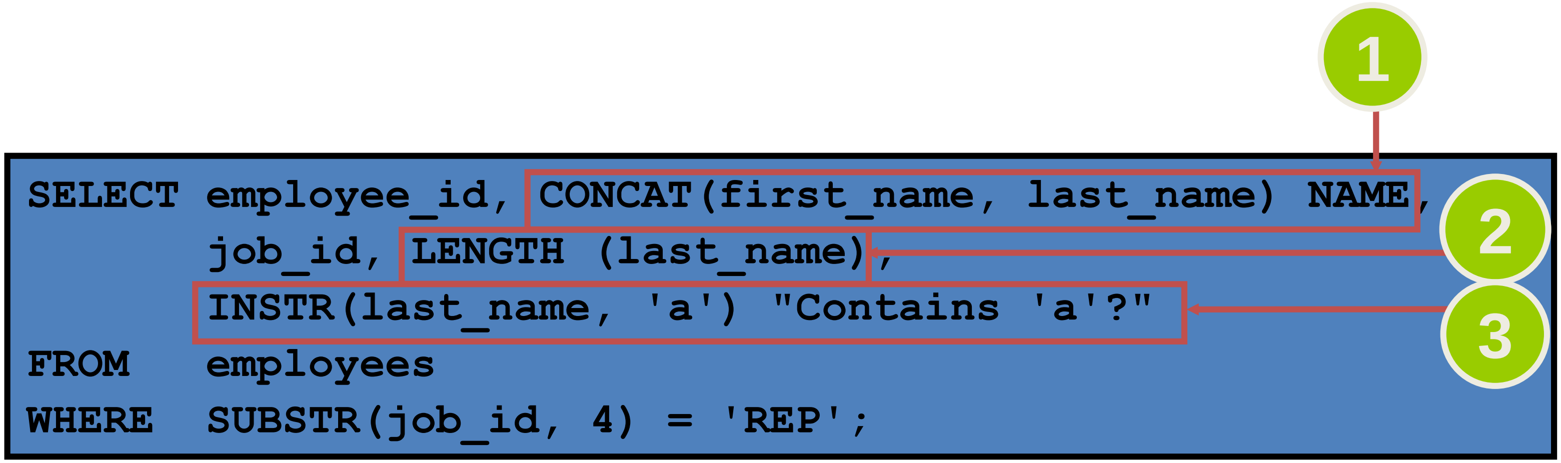
	FIRST_NAME	LAST_NAME	EMAIL
1	Donald	OConnell	DOCONNEL

Character-Manipulation Functions

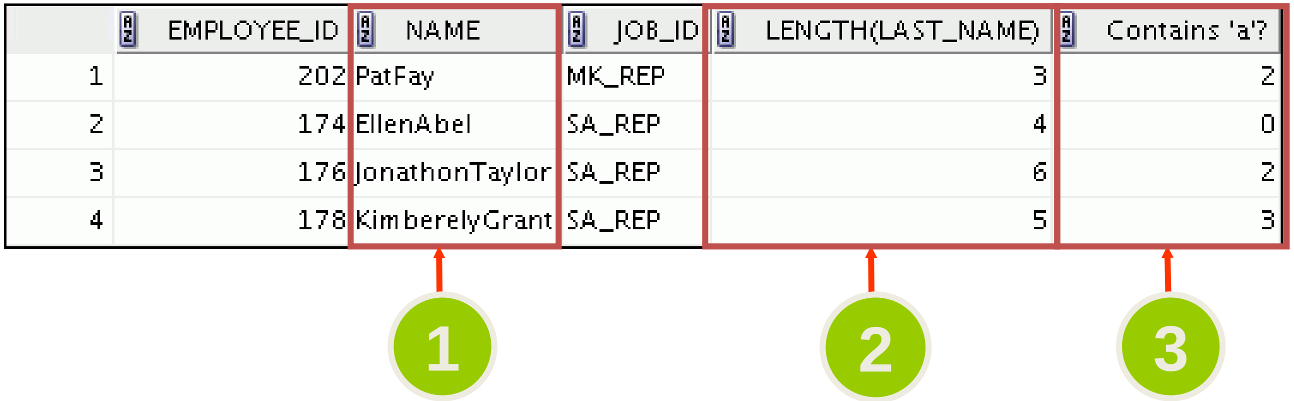
- **These functions manipulate character strings:**

Function	Result
CONCAT('Hello', 'World')	HelloWorld
SUBSTR('HelloWorld',1,5)	Hello
LENGTH('HelloWorld')	10
INSTR('HelloWorld', 'W')	6
LPAD(salary,10,'*')	*****24000
RPAD(salary, 10, '*')	24000*****
REPLACE ('JACK and JUE','J','BL')	BLACK and BLUE
TRIM('H' FROM 'HelloWorld')	elloWorld

Using the Character-Manipulation Functions



```
SELECT employee_id, CONCAT(first_name, last_name) NAME,
       job_id, LENGTH (last_name),
       INSTR(last_name, 'a') "Contains 'a'?"
FROM   employees
WHERE  SUBSTR(job_id, 4) = 'REP';
```



	EMPLOYEE_ID	NAME	JOB_ID	LENGTH(LAST_NAME)	Contains 'a'?
1	202	PatFay	MK_REP	3	2
2	174	EllenAbel	SA_REP	4	0
3	176	JonathonTaylor	SA_REP	6	2
4	178	KimberelyGrant	SA_REP	5	3

Extra Functions

Abs (n)	Returns positive value of n
Ceil (n)	Returns smallest integer greater than or equal to n
Exp(n)	E raised to the nth power
Power(m,n)	M raised to the nth power
Sign(n)	-1 if n is negative, 0 if n is 0 and +1 if n is positive
Ltrim(string,set)	Trims set (of chars) if it appears in the left of string
Rtrim(string,set)	Trims set (of chars) if it appears in the right of string
Translate(mainstring,search_set,replacement_set)	Translates every occurrence of ith character of search_set with ith character in the replacement set
Soundex(string)	Sound pronunciation value of the given string (eg R525 for 'ramasamy')
Greatest	Will find the greatest among the given values
least	Least will find the lowest value among given list

Extra Functions

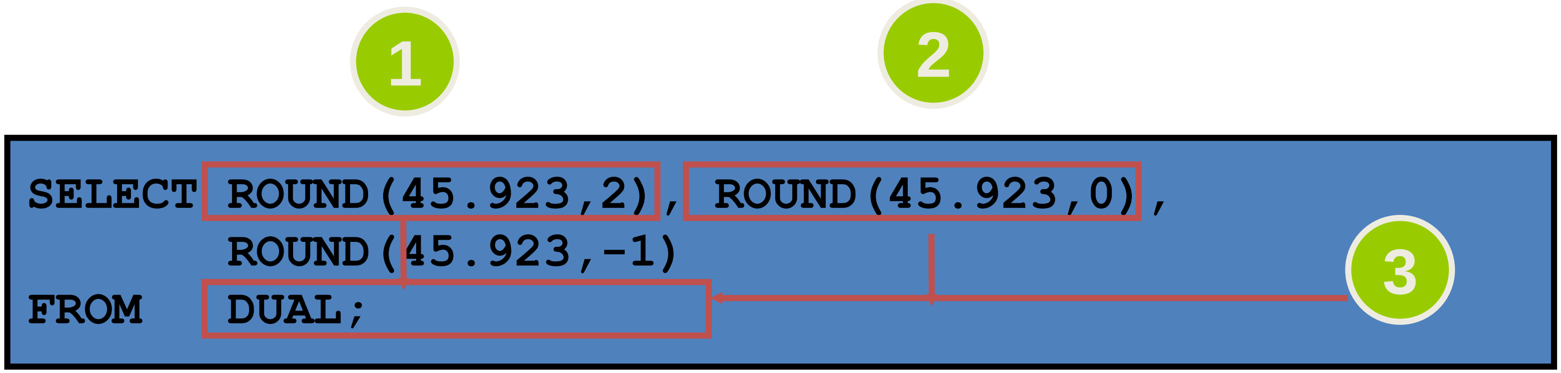
Extract(YEAR|MONTH|DAY|HOUR|MINUTE|SECOND|TIMEZONE_HOUR|TIMEZONE_MINUTE|TIMEZONE_REGION|TIMEZONE_ABBR From Date_or_Interval_value	Extracts any date/time component from a given date/or time interval value
Current_timestamp	Returns current timestamp with time zone
Uid	User ID of the session
User	User name

Number Functions

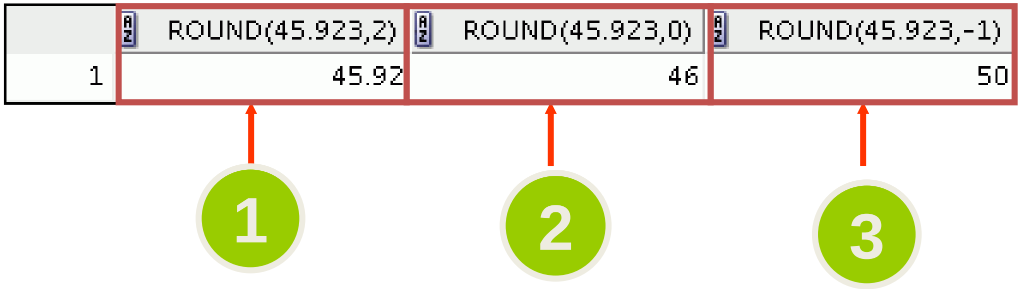
- ROUND: Rounds value to a specified decimal
- TRUNC: Truncates value to a specified decimal
- MOD: Returns remainder of division

Function	Result
ROUND(45.926, 2)	45.93
TRUNC(45.926, 2)	45.92
MOD(1600, 300)	100

Using the ROUND Function



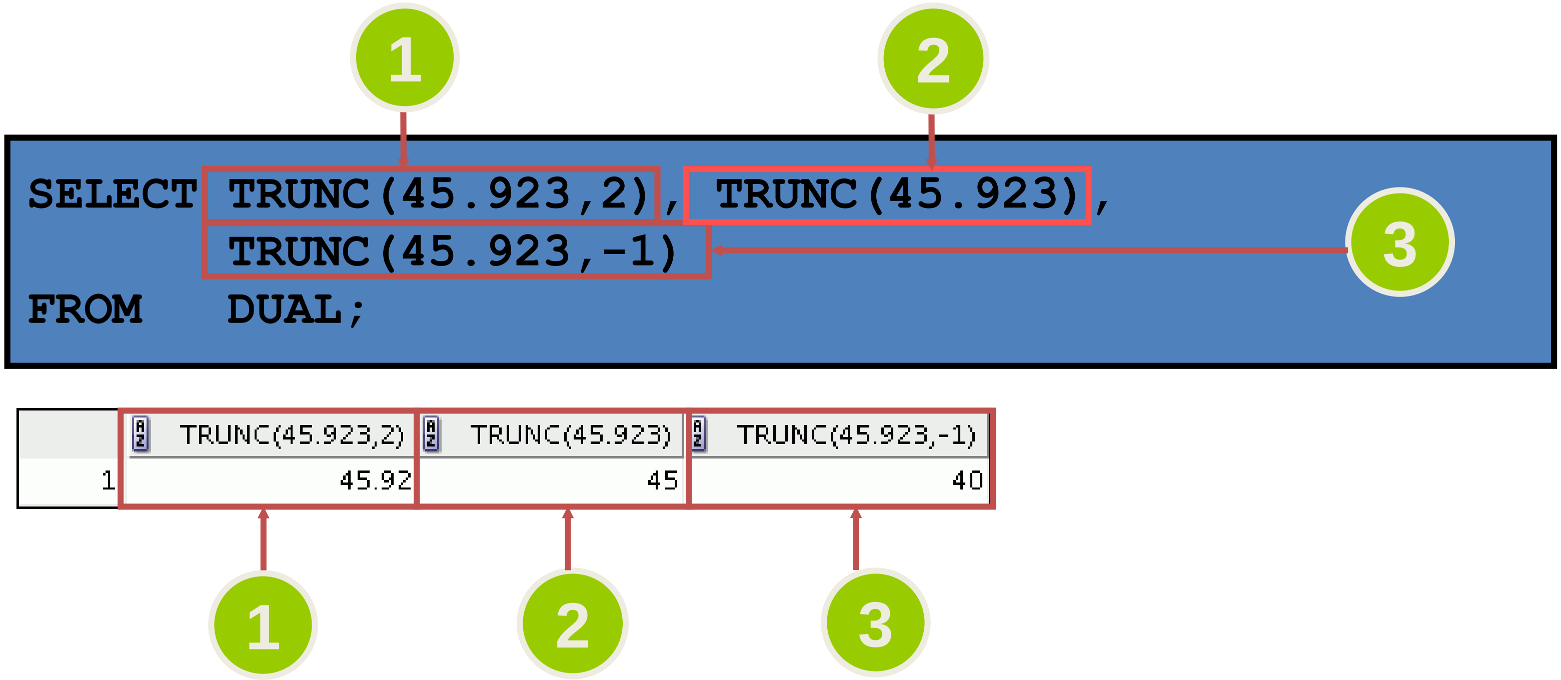
```
SELECT ROUND(45.923,2), ROUND(45.923,0),
       ROUND(45.923,-1)
FROM   DUAL;
```



```
     ROUND(45.923,2)   ROUND(45.923,0)   ROUND(45.923,-1)
1              45.92                46                 50
```

DUAL is a public table that you can use to view results from functions and calculations.

Using the TRUNC Function



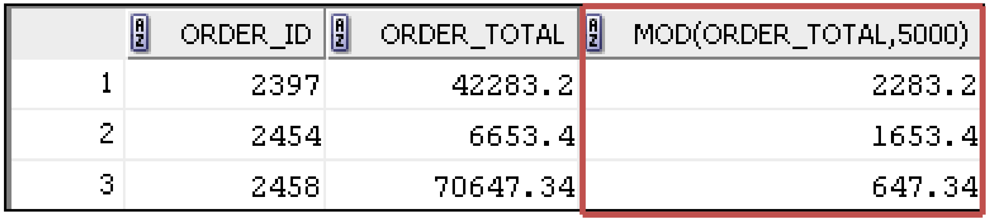
```
SELECT TRUNC(45.923,2), TRUNC(45.923),
       TRUNC(45.923,-1)
FROM   DUAL;
```

```
  TRUNC(45.923,2)  TRUNC(45.923)  TRUNC(45.923,-1)
1           45.92             45                40
```

Using the MOD Function

- For all employees with the job title of Sales Representative, calculate the remainder of the salary after it is divided by 5,000.

```
SELECT   order_id,  order_total, MOD(order_total, 5000)
FROM   orders
WHERE   order_id  IN(2458, 2397, 2454) ;
```



	ORDER_ID	ORDER_TOTAL	MOD(ORDER_TOTAL,5000)
1	2397	42283.2	2283.2
2	2454	6653.4	1653.4
3	2458	70647.34	647.34

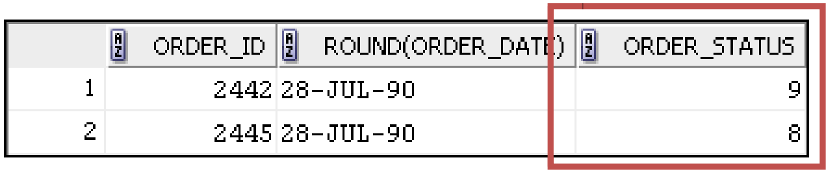
Working with Dates

– **The Oracle Database stores dates in an internal numeric format: century, year, month, day, hours, minutes, and seconds.**

– **The default date display format is DD-MON-RR.**

  - **Enables you to store 21st-century dates in the 20th century by specifying only the last two digits of the year**
  - **Enables you to store 20th-century dates in the 21st century in the same way**

```
SELECT   order_id,  round(order_date) ,  order_status
FROM   orders
WHERE   order_date  <= ‘ 21-MAR-96 ‘  ;
```



	ORDER_ID	ROUND(ORDER_DATE)	ORDER_STATUS
1	2442	28-JUL-90	9
2	2445	28-JUL-90	8

RR Date Format

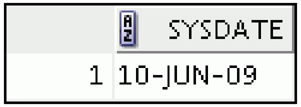
Current Year	Specified Date	RR Format	YY Format
1995	27-OCT-95	1995	1995
1995	27-OCT-17	2017	1917
2001	27-OCT-17	2017	2017
2001	27-OCT-95	1995	2095

		If the specified two-digit year is:	
		0–49	50–99
If two digits of the current year are:	0–49	The return date is in the current century	The return date is in the century before the current one
	50–99	The return date is in the century after the current one	The return date is in the current century

Using the SYSDATE Function

- SYSDATE is a function that returns:
  - Date
  - Time

```
SELECT  sysdate
FROM    dual;
```



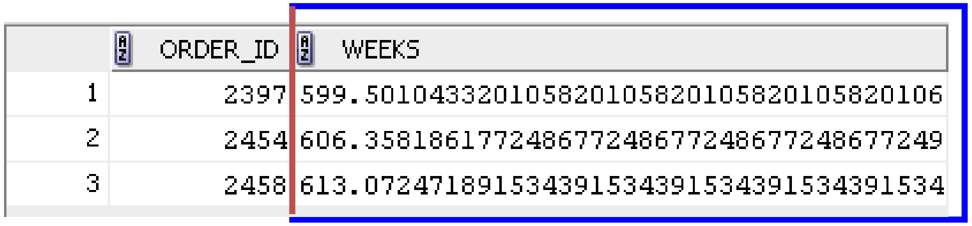
```
        SYSDATE
  1 10-JUN-09
```

Arithmetic with Dates

- Add or subtract a number to or from a date for a resultant date value.
- Subtract two dates to find the number of days between those dates.
- Add hours to a date by dividing the number of hours by 24.

Using Arithmetic Operators with Dates

```
SELECT   order_id, (SYSDATE - round(Order_date)) / 7 AS "WEEKS"
FROM   orders
WHERE   order_id  IN(2458, 2397, 2454);
```



	ORDER_ID	WEEKS
1	2397	599.5010433201058201058201058201058201 06
2	2454	606.3581861772486772486772486772486772 49
3	2458	613.0724718915343915343915343915343915 34

Date-Manipulation Functions

Function	Result
`MONTHS_BETWEEN`	Number of months between two dates
`ADD_MONTHS`	Add calendar months to date
`NEXT_DAY`	Next day of the date specified
`LAST_DAY`	Last day of the month
`ROUND`	Round date
`TRUNC`	Truncate date

Using Date Functions

Function	Result
MONTHS_BETWEEN ('01-SEP-95','11-JAN-94')	19.6774194
ADD_MONTHS (‘31-JAN-96',1)	'29-FEB-96'
NEXT_DAY ('01-SEP-95','FRIDAY')	'08-SEP-95'
LAST_DAY ('01-FEB-95')	'28-FEB-95'

Using ROUND and TRUNC Functions with Dates

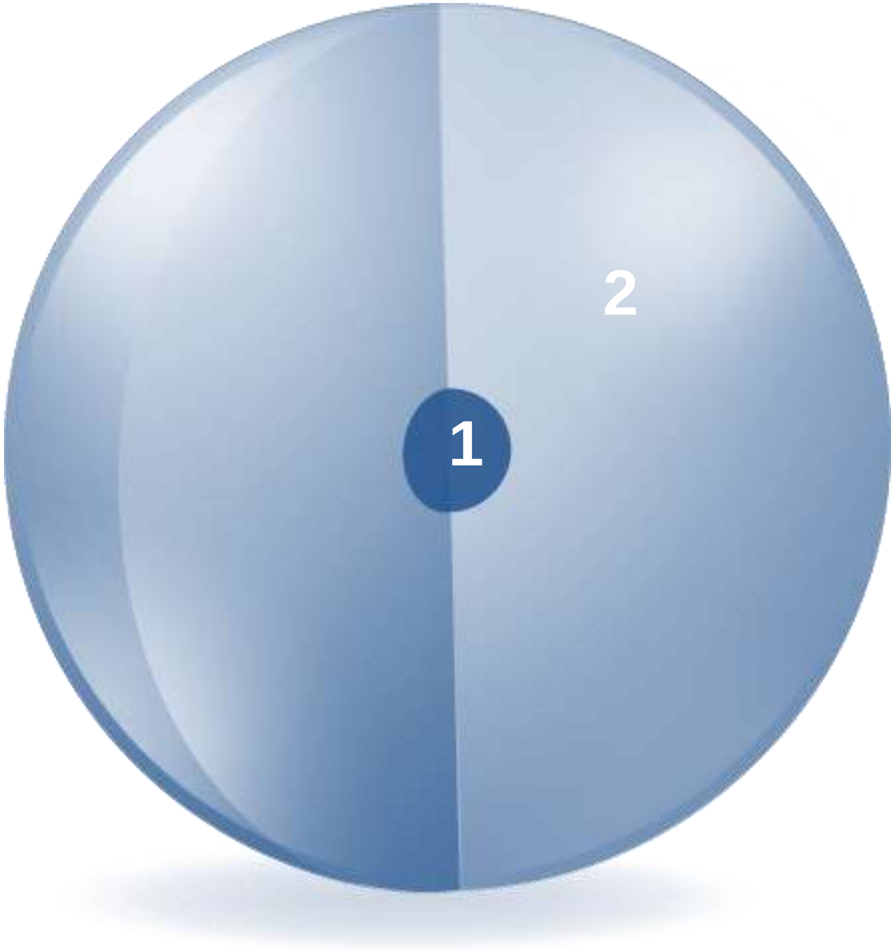
- Assume SYSDATE = '25-JUL-03':

Function	Result
ROUND(SYSDATE,'MONTH')	01-AUG-03
ROUND(SYSDATE ,'YEAR')	01-JAN-04
TRUNC(SYSDATE ,'MONTH')	01-JUL-03
TRUNC(SYSDATE ,'YEAR')	01-JAN-03

Quiz

- **Which of the following statements are true about single-row functions?**
  1. **Manipulate data items**
  2. **Accept arguments and return one value per argument**
  3. **Act on each row that is returned**
  4. **Return one result per set of rows**
  5. **May not modify the data type**
  6. **Can be nested**
  7. **Accept arguments that can be a column or an expression**

Session Summary



1. **Perform calculations on data using functions**

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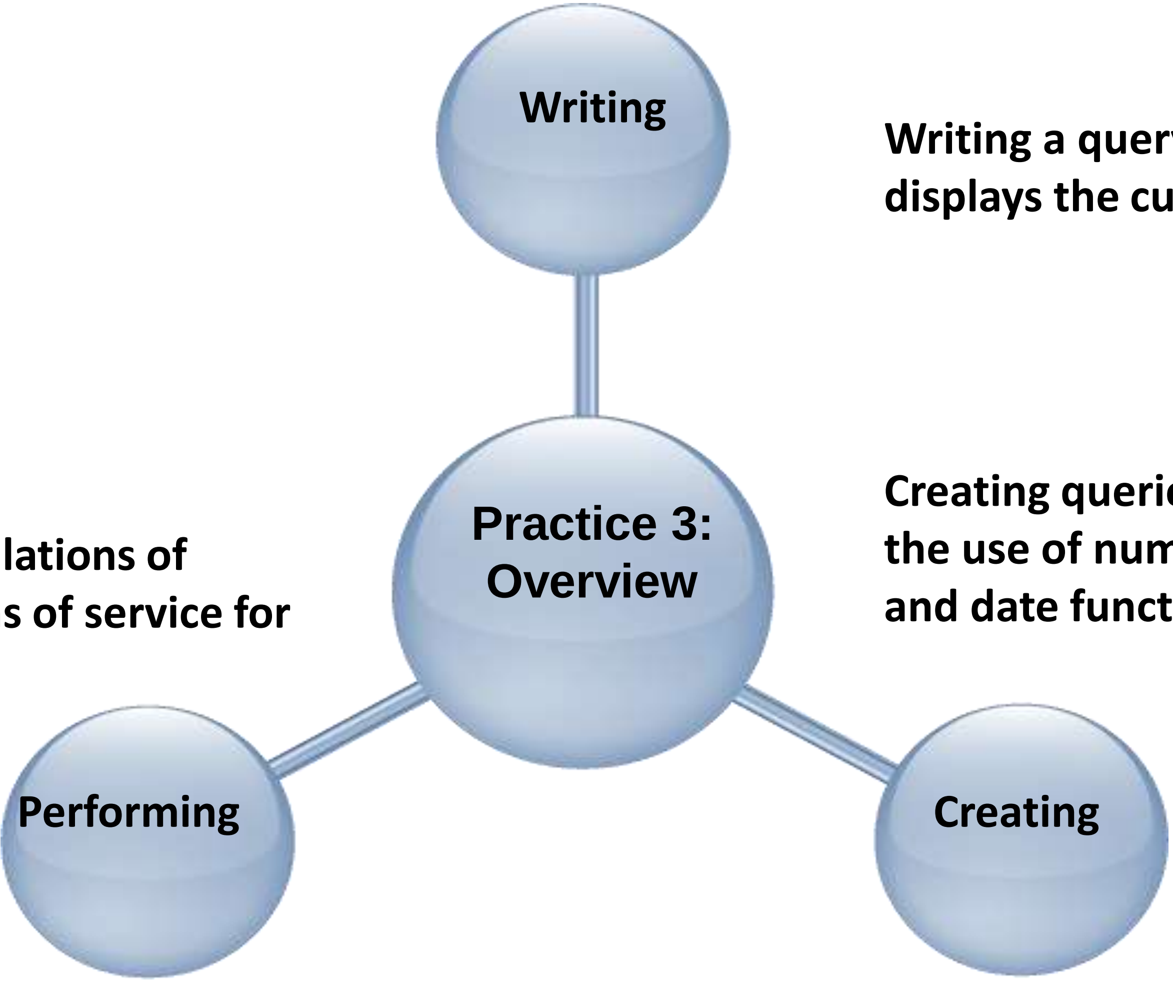
2. **Modify individual data items using functions**

Practice 3: Overview

This practice covers the following topics



Writing a query that displays the current date

Creating queries that require the use of numeric, character, and date functions

Performing calculations of years and months of service for an employee