

SQL Database Programming: Section 4-1: Case and Character Manipulation

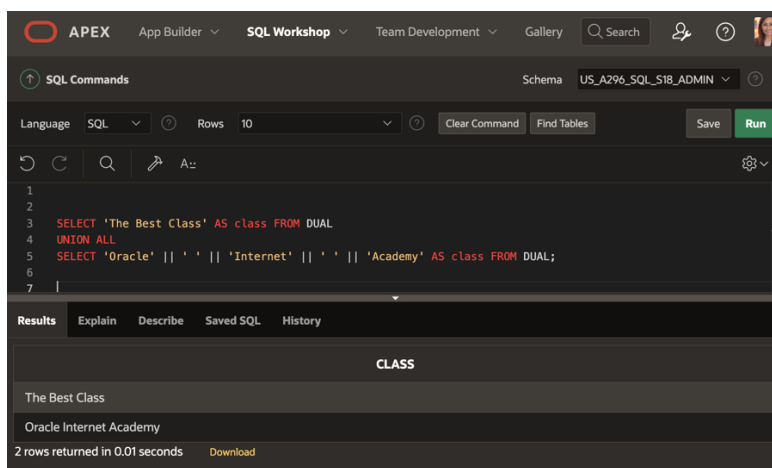
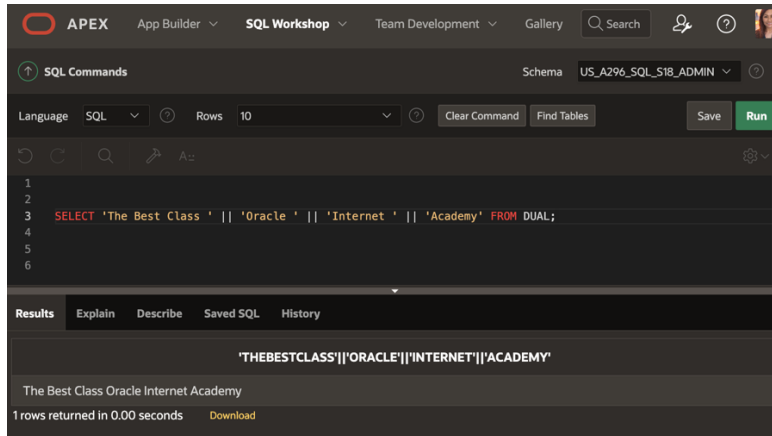
Vocabulary

Dual Table	Dummy table used to view results from functions and calculations.
Format	The arrangement of data for storage or display.
Character functions	Converts alpha character values to uppercase for the first letter of each word, all other letters in lowercase.
Single-row functions	Functions that accept character data as input and can return both character and numeric values.
TRIM	Removes all specified characters from either the beginning or the ending of a string.
Operator	A symbol that represents a quantity or a relationship between quantities.
Single-row functions	Functions that operate on single rows only and return one result per row.
UPPER	Converts alpha characters to upper case.
Input	Raw data entered into the computer
CONCAT	Concatenates the first character value to the second character value; equivalent to concatenation operator ().
Output	Data that is processed into information
LOWER	Converts alpha character values to lowercase.
LPAD	Pads the left side of a character, resulting in a right-justified value
SUBSTR	Returns specific characters from character value starting at a specific character position and going specified character positions long
REPLACE	Replaces a sequence of characters in a string with another set of characters.
INSTR	Returns the numeric position of a named string.
LENGTH	Returns the number of characters in the expression
RPAD	Pads the right-hand side of a character, resulting in a left-justified value.

Try It / Solve It

1) Using the three separate words “Oracle,” “Internet,” and “Academy,” use one command to produce the following output:

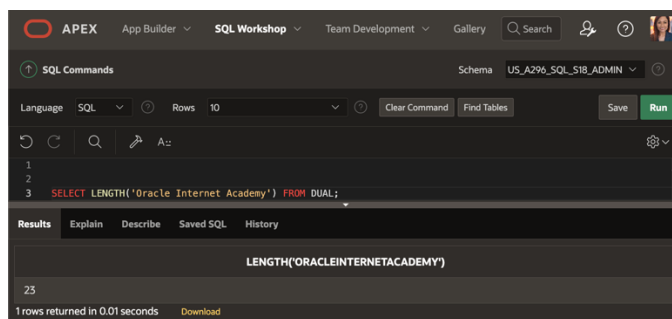
The Best Class
Oracle Internet Academy



2) Use the string “Oracle Internet Academy” to produce the following output:

The Net
net

3) What is the length of the string “Oracle Internet Academy”?



4) What's the position of "I" in "Oracle Internet Academy"?

The screenshot shows the Oracle APEX SQL Workshop interface. The SQL command entered is `SELECT INSTR('Oracle Internet Academy', 'I') FROM DUAL;`. The result displayed is `INSTR('ORACLEINTERNETACADEMY','I')` with the value `8`. The interface includes a top navigation bar with 'APEX', 'App Builder', 'SQL Workshop', 'Team Development', and 'Gallery'. Below the command area, there are tabs for 'Results', 'Explain', 'Describe', 'Saved SQL', and 'History'. The 'Results' tab is active, showing the query result.

5) Starting with the string "Oracle Internet Academy", pad the string to create
****Oracle****Internet****Academy****

The screenshot shows the Oracle APEX SQL Workshop interface. The SQL command entered is `SELECT LPAD(RPAD('Oracle', 10, '*'), 14, '*') || LPAD(RPAD('Internet', 8, '*'), 8, '*') || LPAD(RPAD('Academy', 11, '*'), 15, '*') FROM DUAL;`. The result displayed is `LPAD(RPAD('ORACLE';10,'*');14,'*')||LPAD(RPAD('INTERNET';8,'*');8,'*')||LPAD(RPAD('ACADEMY';11,'*');15,'*')` with the value `****Oracle****Internet****Academy****`. The interface includes a top navigation bar with 'Oracle APEX Home', 'App Builder', 'SQL Workshop', 'Team Development', and 'Gallery'. Below the command area, there are tabs for 'Results', 'Explain', 'Describe', 'Saved SQL', and 'History'. The 'Results' tab is active, showing the query result.

6) Starting with the string "Oracle Internet Academy", pad the string to produce:
Oracle\$\$\$Internet\$\$\$Academy

The screenshot shows the Oracle APEX SQL Workshop interface. The SQL command entered is `SELECT 'Oracle' || '$$$' || 'Internet' || '$$$' || 'Academy' FROM DUAL;`. The result displayed is `'ORACLE' || '$$$' || 'INTERNET' || '$$$' || 'ACADEMY'` with the value `Oracle$$$Internet$$$Academy`. The interface includes a top navigation bar with 'APEX', 'App Builder', 'SQL Workshop', 'Team Development', and 'Gallery'. Below the command area, there are tabs for 'Results', 'Explain', 'Describe', 'Saved SQL', and 'History'. The 'Results' tab is active, showing the query result.

7) Using the string 'Oracle Internet Academy', produce the output shown using the REPLACE function.

The Best Class
Oracle 2013-2014 Academy

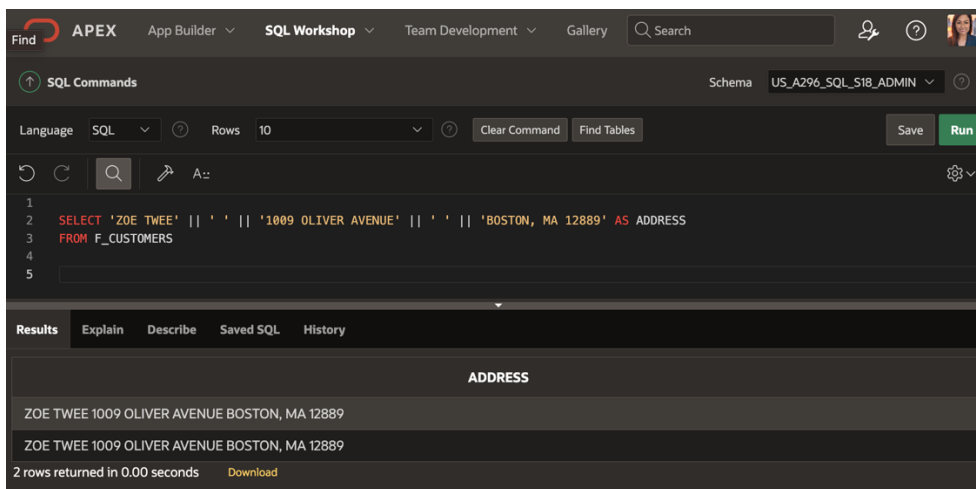
The screenshot shows the APEX SQL Workshop interface. The SQL command entered is: `SELECT REPLACE('Oracle Internet Academy', 'Internet', '2013-2014') FROM DUAL;`. The results tab shows a single row with the output: `REPLACE('ORACLEINTERNETACADEMY','INTERNET','2013-2014')` and the text "Oracle 2013-2014 Academy".

The screenshot shows the APEX SQL Workshop interface. The SQL command entered is: `SELECT 'The Best Class' AS class FROM DUAL UNION ALL SELECT 'Oracle' || ' ' || '2013-2014' || ' ' || 'Academy' AS class FROM DUAL;`. The results tab shows two rows: "The Best Class" and "Oracle 2013-2014 Academy".

8) List the order date and the order total from the Global Fast Foods F_ORDERS table. Name the order total as TOTAL and fill in the empty spaces to the left of the order total with \$.

The screenshot shows the APEX SQL Workshop interface. The SQL command entered is: `SELECT ORDER_DATE, LPAD(ORDER_TOTAL, 10, '$') AS TOTAL FROM F_ORDERS;`. The results tab shows a single row with the output: "10-Dec-2002" and "\$\$\$\$103.02".

- 9) Write a query that will output a column called “ADDRESS” which has the following information:
ZOE TWEE 1009 OLIVER AVENUE BOSTON, MA 12889. Use the Global Fast Foods F_CUSTOMERS table.



The screenshot shows the APEX SQL Workshop interface. The SQL command is:

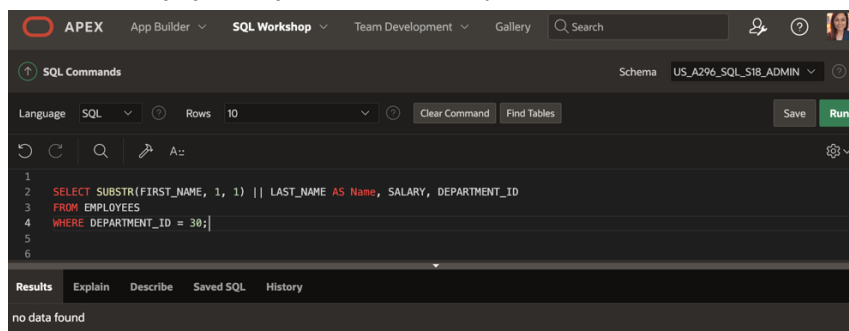
```
1  
2 SELECT 'ZOE TWEE' || ' ' || '1009 OLIVER AVENUE' || ' ' || 'BOSTON, MA 12889' AS ADDRESS  
3 FROM F_CUSTOMERS  
4  
5
```

The results show two rows of data:

ADDRESS
ZOE TWEE 1009 OLIVER AVENUE BOSTON, MA 12889
ZOE TWEE 1009 OLIVER AVENUE BOSTON, MA 12889

2 rows returned in 0.00 seconds

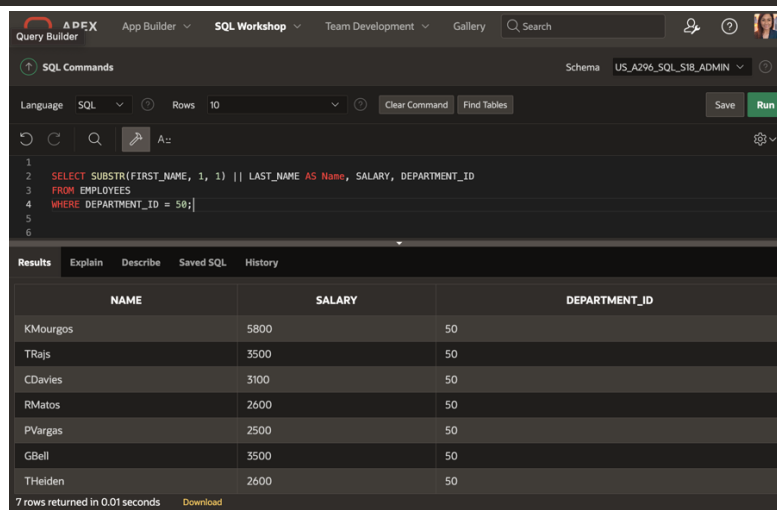
- 10) Write a query to return the first character of the first name concatenated to the last_name, the salary, and the department id for employees working in department 20. Give the first expression an alias of Name. Use the EMPLOYEES table. Change the query to use a substitution variable instead of the hard coded value 20 for department id. Run the query for department 30 and 50 without changing the original where-clause in your statement.



The screenshot shows the APEX SQL Workshop interface. The SQL command is:

```
1  
2 SELECT SUBSTR(FIRST_NAME, 1, 1) || LAST_NAME AS Name, SALARY, DEPARTMENT_ID  
3 FROM EMPLOYEES  
4 WHERE DEPARTMENT_ID = 30;  
5  
6
```

The results show no data found.



The screenshot shows the APEX SQL Workshop interface. The SQL command is:

```
1  
2 SELECT SUBSTR(FIRST_NAME, 1, 1) || LAST_NAME AS Name, SALARY, DEPARTMENT_ID  
3 FROM EMPLOYEES  
4 WHERE DEPARTMENT_ID = 50;  
5  
6
```

The results show 7 rows of data:

NAME	SALARY	DEPARTMENT_ID
KMourgos	5800	50
TRajs	3500	50
CDavies	3100	50
RMatos	2600	50
PVargas	2500	50
GBell	3500	50
THelden	2600	50

7 rows returned in 0.01 seconds

11) Using a substitution variable for the department name, write a query listing department id, department name, and location id for departments located in the_department_of_your_choice. Use the DEPARTMENTS table. Note: All substitution variables in OAE are treated as character strings, so no quotes (' ') are needed.

The screenshot shows the APEX SQL Workshop interface. The SQL Commands pane contains the following query:

```

1
2 SELECT DEPARTMENT_ID, DEPARTMENT_NAME, LOCATION_ID
3 FROM DEPARTMENTS
4 WHERE DEPARTMENT_NAME = 'Shipping';
5
6

```

The Results pane shows the following table:

DEPARTMENT_ID	DEPARTMENT_NAME	LOCATION_ID
50	Shipping	1500

1 rows returned in 0.00 seconds

The screenshot shows the APEX SQL Workshop interface. The SQL Commands pane contains the following query:

```

1
2 SELECT DEPARTMENT_ID, DEPARTMENT_NAME, LOCATION_ID
3 FROM DEPARTMENTS
4 WHERE DEPARTMENT_NAME = 'Marketing';
5
6

```

The Results pane shows the following table:

DEPARTMENT_ID	DEPARTMENT_NAME	LOCATION_ID
20	Marketing	1800

1 rows returned in 0.00 seconds

12) Write a query that returns all the employee data depending on the month of their hire date. Use the EMPLOYEES table. The statement should return the month part of the hire date which is then compared to an abbreviated month (JAN, FEB, MAR) passed into the query via a substitution variable.

The screenshot shows the APEX SQL Workshop interface. The SQL Commands pane contains the following query:

```

1
2 SELECT *
3 FROM EMPLOYEES
4 WHERE UPPER(HIRE_DATE) = 'MON';

```

The Results pane shows the message: no data found

SQL Database Programming: Section 4-2: Number Functions

Vocabulary

TRUNC: Used to terminate the column, expression, or value to a specified number of decimal places

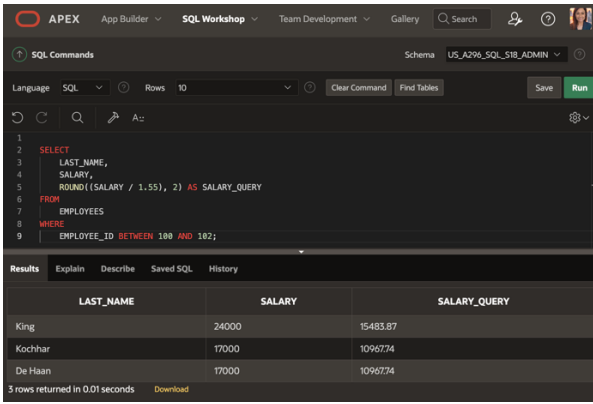
Number functions: These functions accept numeric input and return numeric values.

MOD function: Returns the remainder of a division.

ROUND: Rounds the column, expression, or value to a set number of decimal places.

Try It / Solve It

1) Display Oracle database employee last_name and salary for employee_ids between 100 and 102. Include a third column that divides each salary by 1.55 and rounds the result to two decimal places.



The screenshot shows the APEX SQL Workshop interface. The SQL command is as follows:

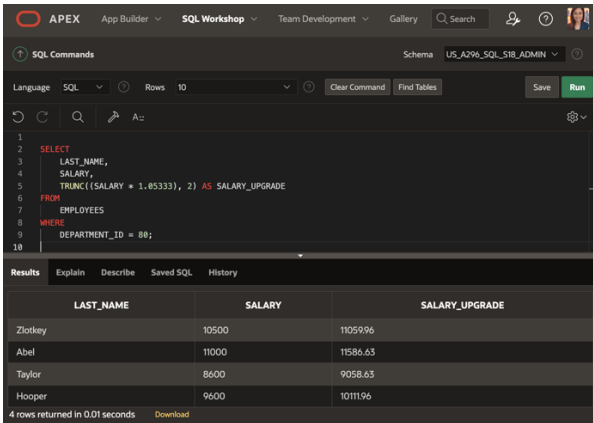
```
1 SELECT
2   LAST_NAME,
3   SALARY,
4   ROUND(SALARY / 1.55, 2) AS SALARY_QUERY
5 FROM
6   EMPLOYEES
7 WHERE
8   EMPLOYEE_ID BETWEEN 100 AND 102;
```

The results table displays the following data:

LAST_NAME	SALARY	SALARY_QUERY
King	24000	15483.87
Kochhar	17000	10967.74
De Haan	17000	10967.74

3 rows returned in 0.01 seconds

2) Display employee last_name and salary for those employees who work in department 80. Give each of them a raise of 5.333% and truncate the result to two decimal places.



The screenshot shows the APEX SQL Workshop interface. The SQL command is as follows:

```
1 SELECT
2   LAST_NAME,
3   SALARY,
4   TRUNC((SALARY * 1.05333), 2) AS SALARY_UPGRADE
5 FROM
6   EMPLOYEES
7 WHERE
8   DEPARTMENT_ID = 80;
```

The results table displays the following data:

LAST_NAME	SALARY	SALARY_UPGRADE
Zlotkey	10500	11059.96
Abel	11000	11586.63
Taylor	8600	9058.63
Hooper	9600	10111.96

4 rows returned in 0.01 seconds

3) Use a MOD number function to determine whether 38873 is an even number or an odd number.

Unable to complete this question. I keep getting an error message. It might be that the SQL queries I entered are wrong.

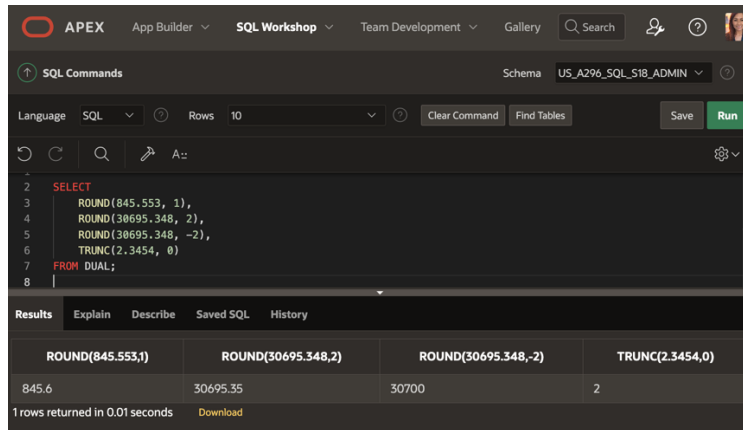
4) Use the DUAL table to process the following numbers:

845.553 - round to one decimal place

30695.348 - round to two decimal places

30695.348 - round to -2 decimal places

2.3454 - truncate the 454 from the decimal place



The screenshot shows the APEX SQL Workshop interface. The SQL command area contains the following query:

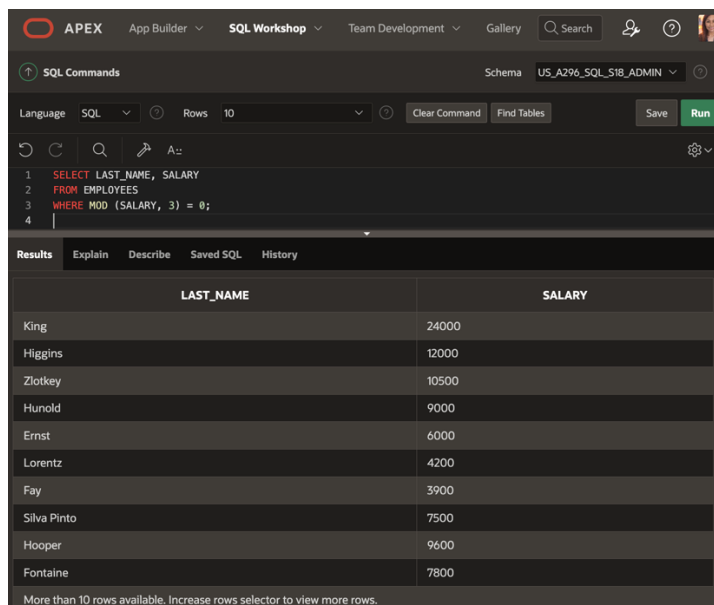
```
SELECT
  ROUND(845.553, 1),
  ROUND(30695.348, 2),
  ROUND(30695.348, -2),
  TRUNC(2.3454, 0)
FROM DUAL;
```

The Results tab displays the output of the query in a table format:

ROUND(845.553,1)	ROUND(30695.348,2)	ROUND(30695.348,-2)	TRUNC(2.3454,0)
845.6	30695.35	30700	2

1 rows returned in 0.01 seconds

5) Divide each employee's salary by 3. Display only those employees' last names and salaries who earn a salary that is a multiple of 3.



The screenshot shows the APEX SQL Workshop interface. The SQL command area contains the following query:

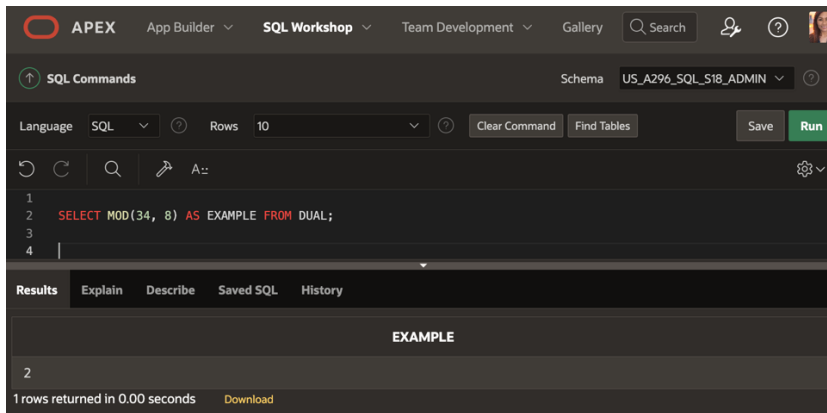
```
SELECT LAST_NAME, SALARY
FROM EMPLOYEES
WHERE MOD (SALARY, 3) = 0;
```

The Results tab displays the output of the query in a table format:

LAST_NAME	SALARY
King	24000
Higgins	12000
Zlotkey	10500
Hunold	9000
Ernst	6000
Lorentz	4200
Fay	3900
Silva Pinto	7500
Hooper	9600
Fontaine	7800

More than 10 rows available. Increase rows selector to view more rows.

6) Divide 34 by 8. Show only the remainder of the division. Name the output as EXAMPLE.



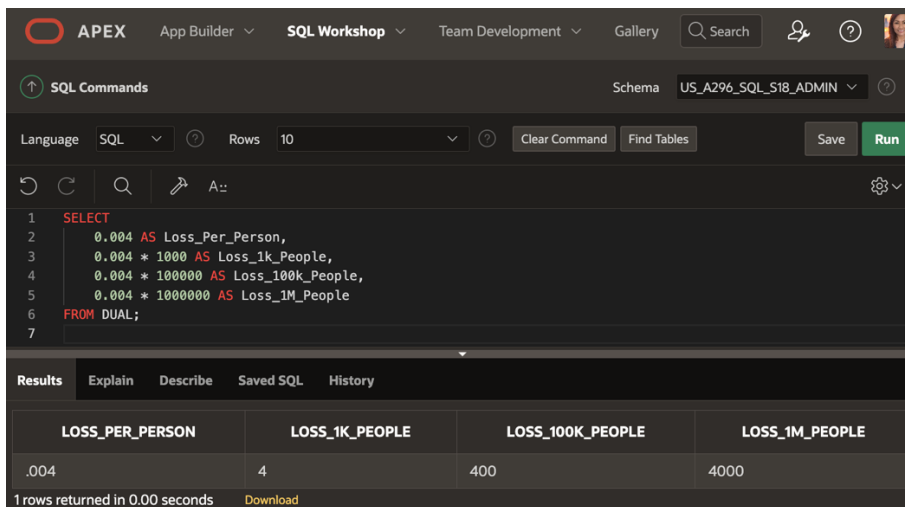
The screenshot shows the APEX SQL Workshop interface. The SQL command entered is: `SELECT MOD(34, 8) AS EXAMPLE FROM DUAL;`. The results pane shows a single row with the value 2, labeled as EXAMPLE. The status bar indicates "1 rows returned in 0.00 seconds".

```
SELECT MOD(34, 8) AS EXAMPLE FROM DUAL;
```

EXAMPLE
2

1 rows returned in 0.00 seconds

7) How would you like your paycheck – rounded or truncated? What if your paycheck was calculated to be \$565.784 for the week, but you noticed that it was issued for \$565.78. The loss of .004 cent would probably make very little difference to you. However, what if this was done to one thousand people, one hundred thousand people, or one million people! Would it make a difference then? How much of a difference?



The screenshot shows the APEX SQL Workshop interface. The SQL command entered is: `SELECT .004 AS Loss_Per_Person, .004 * 1000 AS Loss_1k_People, .004 * 100000 AS Loss_100k_People, .004 * 1000000 AS Loss_1M_People FROM DUAL;`. The results pane shows a single row with the values .004, 4, 400, and 4000. The status bar indicates "1 rows returned in 0.00 seconds".

```
SELECT .004 AS Loss_Per_Person, .004 * 1000 AS Loss_1k_People, .004 * 100000 AS Loss_100k_People, .004 * 1000000 AS Loss_1M_People FROM DUAL;
```

LOSS_PER_PERSON	LOSS_1K_PEOPLE	LOSS_100K_PEOPLE	LOSS_1M_PEOPLE
.004	4	400	4000

1 rows returned in 0.00 seconds

SQL Database Programming: Section 4-3: Date Functions

Vocabulary

SYSDATE: A function that returns the current date and time of the database server.

ADD_MONTHS: Add calendar months to date

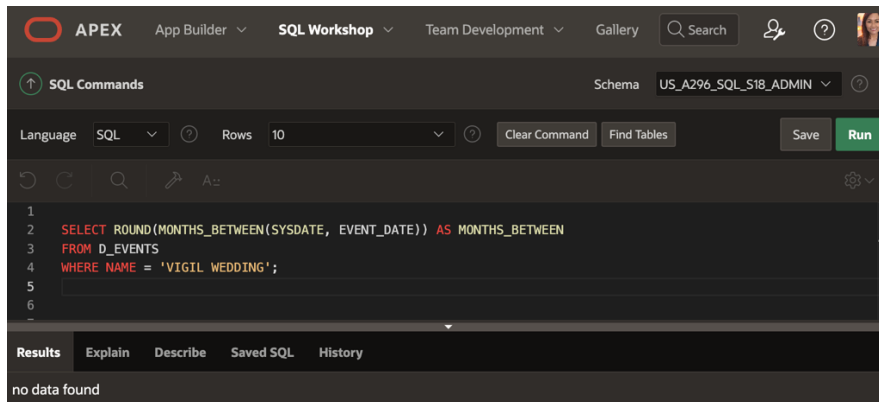
LAST_DAY: Last day of the month

NEXT_DAY: Next day of the date specified

MONTHS_BETWEEN: Number of months between due dates

Try It / Solve It

1. For DJs on Demand, display the number of months between the event_date of the Vigil wedding and today's date. Round to the nearest month.



2. Display the days between the start of last summer's school vacation break and the day school started this year. Assume 30.5 days per month. Name the output "Days."

Unable to complete this question. I keep getting an error message. It might be that the SQL queries I entered are wrong.

3. Display the days between January 1 and December 31.

The screenshot shows the APEX SQL Workshop interface. The SQL command entered is:

```
1  
2 SELECT (TO_DATE('2023-12-31', 'YYYY-MM-DD') - TO_DATE('2023-01-01', 'YYYY-MM-DD')) AS "DAYS"  
3 FROM DUAL;  
4  
5
```

The results tab shows a single row with the value 364 under the alias DAYS.

DAYS
364

1 rows returned in 0.00 seconds

4. Using one statement, round today's date to the nearest month and nearest year and truncate it to the nearest month and nearest year. Use an alias for each column.

The screenshot shows the APEX SQL Workshop interface. The SQL command entered is:

```
1  
2 SELECT  
3     ROUND(SYSDATE, 'Month'),  
4     ROUND(SYSDATE, 'Year'),  
5     TRUNC(SYSDATE, 'Month'),  
6     TRUNC(SYSDATE, 'Year')  
7 FROM DUAL;  
8
```

The results tab shows a single row with four columns: ROUND(SYSDATE,'MONTH'), ROUND(SYSDATE,'YEAR'), TRUNC(SYSDATE,'MONTH'), and TRUNC(SYSDATE,'YEAR').

ROUND(SYSDATE,'MONTH')	ROUND(SYSDATE,'YEAR')	TRUNC(SYSDATE,'MONTH')	TRUNC(SYSDATE,'YEAR')
01-Oct-2024	01-Jan-2025	01-Oct-2024	01-Jan-2024

1 rows returned in 0.01 seconds

5. What is the last day of the month for June 2005? Use an alias for the output.

The screenshot shows the APEX SQL Workshop interface. The SQL Commands tab is active, displaying the following query:

```
1  
2 SELECT LAST_DAY(TO_DATE('2005-06', 'YYYY-MM')) AS "JUNE_LAST_DAY"  
3 FROM DUAL;  
4  
5
```

The Results tab is selected, showing a single row with the column header **JUNE_LAST_DAY** and the value **30-Jun-2005**. The status bar indicates "1 rows returned in 0.00 seconds" and a "Download" button is visible.

6. Display the number of years between the Global Fast Foods employee Bob Miller's birthday and today. Round to the nearest year.

The screenshot shows the APEX SQL Workshop interface. The SQL Commands tab is active, displaying the following query:

```
1  
2 SELECT ROUND(MONTHS_BETWEEN(SYSDATE, BIRTHDATE) / 12) AS YEARS_BETWEEN  
3 FROM F_STAFFS  
4 WHERE FIRST_NAME = 'Bob' AND LAST_NAME = 'Miller';  
5
```

The Results tab is selected, showing a single row with the column header **YEARS_BETWEEN** and the value **46**. The status bar indicates "1 rows returned in 0.00 seconds" and a "Download" button is visible.

7. Your next appointment with the dentist is six months from today. On what day will you go to the dentist? Name the output, "Appointment."

The screenshot shows the APEX SQL Workshop interface. The SQL Commands tab is active, displaying the following query:

```
1  
2 SELECT ADD_MONTHS(SYSDATE, 6) AS Appointment  
3 FROM DUAL;  
4
```

The Results tab is selected, showing a single row with the column header **APPOINTMENT** and the value **01-Apr-2025**. The status bar indicates "1 rows returned in 0.00 seconds" and a "Download" button is visible.

8. The teacher said you have until the last day of this month to turn in your research paper. What day will this be? Name the output, "Deadline."

The screenshot shows the APEX SQL Workshop interface. The SQL command is: `SELECT LAST_DAY(SYSDATE) AS Deadline FROM DUAL;`. The results show a single row with the value `31-Oct-2024` under the column heading `DEADLINE`. The status bar indicates "1 rows returned in 0.00 seconds".

```
1
2 SELECT LAST_DAY(SYSDATE) AS Deadline
3 FROM DUAL;
4
```

DEADLINE
31-Oct-2024

1 rows returned in 0.00 seconds Download

9. How many months between your birthday this year and January 1 next year?

The screenshot shows the APEX SQL Workshop interface. The SQL command is: `SELECT MONTHS_BETWEEN(TO_DATE('2025-01-01', 'YYYY-MM-DD'), TO_DATE('2024-08-03', 'YYYY-MM-DD')) AS MONTHS_BETWEEN FROM DUAL;`. The results show a single row with the value `4.93548387096774193548387096774193548387` under the column heading `MONTHS_BETWEEN`. The status bar indicates "1 rows returned in 0.00 seconds".

```
1
2 SELECT MONTHS_BETWEEN(TO_DATE('2025-01-01', 'YYYY-MM-DD'), TO_DATE('2024-08-03', 'YYYY-MM-DD')) AS MONTHS_BETWEEN
3 FROM DUAL;
4
```

MONTHS_BETWEEN
4.93548387096774193548387096774193548387

1 rows returned in 0.00 seconds Download

10. What's the date of the next Friday after your birthday this year? Name the output, "First Friday."

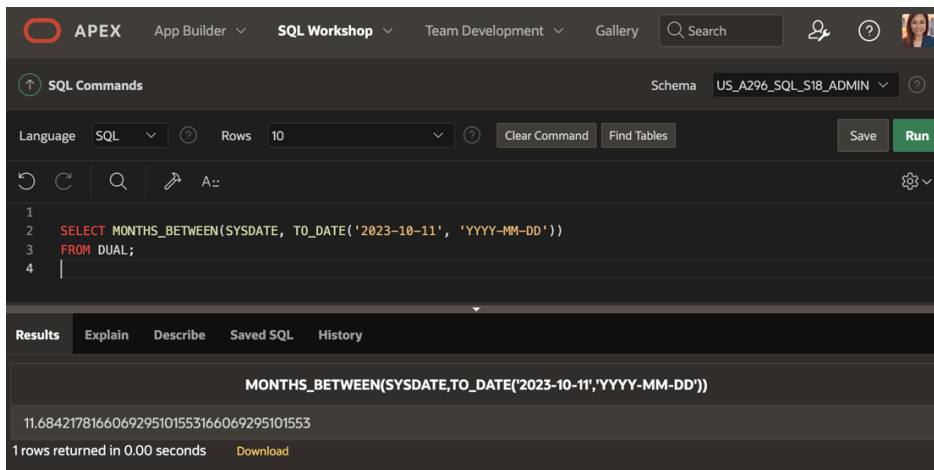
The screenshot shows the APEX SQL Workshop interface. The SQL command is: `SELECT NEXT_DAY(TO_DATE('2024-08-03', 'YYYY-MM-DD'), 'FRIDAY') AS "First Friday" FROM DUAL;`. The results show a single row with the value `09-Aug-2024` under the column heading `First Friday`. The status bar indicates "1 rows returned in 0.00 seconds".

```
1
2 SELECT NEXT_DAY(TO_DATE('2024-08-03', 'YYYY-MM-DD'), 'FRIDAY') AS "First Friday"
3 FROM DUAL;
4
```

First Friday
09-Aug-2024

1 rows returned in 0.00 seconds Download

11. Name a date function that will return a number.



The screenshot shows the APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop', 'Team Development', and 'Gallery'. The 'SQL Commands' tab is active, and the schema is set to 'US_A296_SQL_S18_ADMIN'. The language is 'SQL' and the number of rows is set to '10'. The query editor contains the following SQL code:

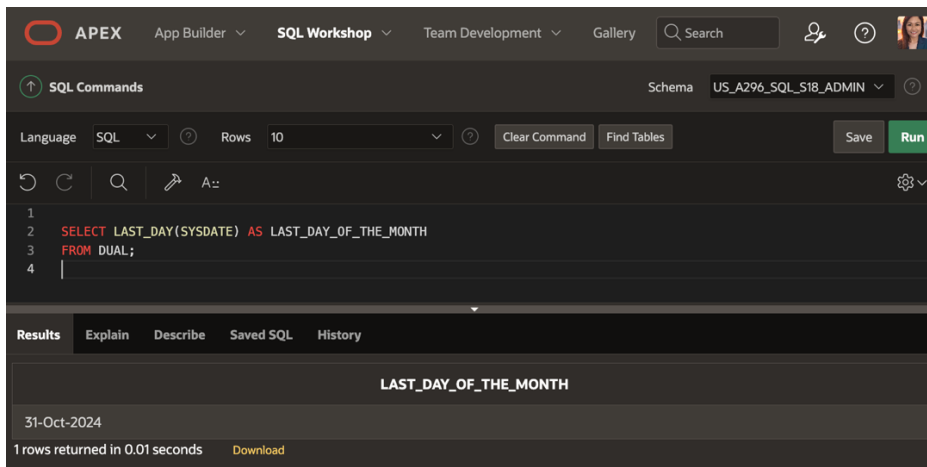
```
1  
2 SELECT MONTHS_BETWEEN(SYSDATE, TO_DATE('2023-10-11', 'YYYY-MM-DD'))  
3 FROM DUAL;  
4
```

The 'Results' tab is selected, showing the output of the query:

MONTHS_BETWEEN(SYSDATE,TO_DATE('2023-10-11','YYYY-MM-DD'))
11.6842178166069295101553166069295101553

1 rows returned in 0.00 seconds. A 'Download' button is visible.

12. Name a date function that will return a date.



The screenshot shows the APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop', 'Team Development', and 'Gallery'. The 'SQL Commands' tab is active, and the schema is set to 'US_A296_SQL_S18_ADMIN'. The language is 'SQL' and the number of rows is set to '10'. The query editor contains the following SQL code:

```
1  
2 SELECT LAST_DAY(SYSDATE) AS LAST_DAY_OF_THE_MONTH  
3 FROM DUAL;  
4
```

The 'Results' tab is selected, showing the output of the query:

LAST_DAY_OF_THE_MONTH
31-Oct-2024

1 rows returned in 0.01 seconds. A 'Download' button is visible.

13. Give one example of why it is important for businesses to be able to manipulate date data?

It is important for businesses to manipulate date data to assist in making informed decisions based on observed trends that have been organized through date manipulation. For instance, businesses can develop effective strategies for targeting market sales based on current trends, such as those in the fashion industry.