Database Design

3-3

Introduction to Functions
Objectives

This lesson covers the following objectives:

• Identify appropriate applications of single-row functions in query statements

• Classify a function as a single-row or multi-row function

• Differentiate between single-row functions and multi-row functions and the results returned by each
Purpose

• When you put money in a drink machine, something happens between the time the money is deposited and your favorite drink is dispensed.

• The transaction is processed internally by the machine.

• Your money is the input and the drink is the output.

• The machine performs a function.

• The machine:
  – Counts your money
  – Makes sure your selection is chosen
  – Returns change, if necessary
Purpose

• In SQL, there are many types of functions that are used to transform input in one form to output in another form.

• These functions are used to manipulate data values.

• Functions are small programs that perform an action on a value or column and produce something different as output.
Functions

• Functions have both input and output. Input into a function is referred to as an argument.

• In the drink machine example, the input is money and the output is a drink.
Functions

- Oracle has two distinct types of functions:
  - Single-Row
  - Multiple-Row
Single-Row Versus Multiple-Row Functions

• Single-row functions operate on single rows only and return one result per row.

• There are different types of single-row functions including character, number, date, and conversion functions.

• Multiple-row functions can manipulate groups of rows to give one result per group of rows.

• These functions are also known as group functions.
Single-Row Functions

• In SQL, Single-Row functions can be used to:
  – Perform calculations such as rounding numbers to a specified decimal place
  – Modify individual data items such as converting character values from uppercase to lowercase
Single-Row Functions

- Format dates and numbers for display such as converting the internal numeric database date format to a standard format
- Convert column data types such as converting a character string to a number or date
Single-Row Functions

• Single-Row Functions accept one or more arguments and will return a single result per row.

• So if you apply the single row function to 12 rows, you will get 12 results out of the single row function.

• In summary, single-row functions do the following:
  – Manipulate data items
  – Accept arguments and return one value
  – Act on each row returned
  – Return one result per row
  – Can modify the data type
  – Can be nested
Multiple-Row Functions

• Multiple-Row (or Group) functions take many rows as input, and return a single value as output.

• The rows input may be the whole table or the table split into smaller groups.

• Examples of Multiple-Row (Group) functions include:
  – MAX: finds the highest value in a group of rows
  – MIN: finds the lowest value in a group of rows
  – AVG: finds the average value in a group of rows
Terminology

Key terms used in this lesson included:

• Single Row Function
• Multiple Row Function
Summary

In this lesson, you should have learned how to:

• Identify appropriate applications of single-row functions in query statements
• Classify a function as a single-row or multi-row function
• Differentiate between single-row functions and multi-row functions and the results returned by each