Lesson 5

Using Functions

Learning Objectives

Students will learn to:

* Display dates and times with functions
* Summarize data with functions
* Use a financial function
* Use formulas to create subtotals
* Uncover formula errors
* Print formulas

MOS Skills

* Demonstrate how to apply the SUM function *4.2.1*
* Demonstrate how to apply the COUNT function *4.2.3*
* Demonstrate how to apply the AVERAGE function *4.2.4*
* Demonstrate how to apply the MIN and MAX functions *4.2.2*

Lesson Summary — Lecture Notes

In Lesson 5, students learn how to display dates and times with functions, how to summarize data with functions, how to use a financial function, how to use formulas to create subtotals, how to uncover formula errors, and how to print formulas.

First, students learn that a function is a predefined formula that performs a calculation. Excel’s built-in functions are designed to perform different types of calculations—from simple to complex. When you apply a function to specific data, you eliminate the time involved in manually constructing a formula. Using functions ensures the accuracy of the formula’s results. You can type functions directly into Excel or use the tools on the FORMULAS tab to help you fill in formulas with the correct syntax.

Students then learn that in Excel, dates are numbers. When you see a date in a worksheet, it’s actually a numeric value formatted to look like a date. The same principle applies to time. Two functions display the current date and/or time in a worksheet: NOW and TODAY. NOW returns the current date and time, whereas TODAY returns the current date but not the time. Neither of these functions uses arguments, so you insert blank parentheses after them. With NOW and TODAY, you can create automatically updated dates and times in worksheets that you frequently revisit and update.

Next, students learn that functions provide an easy way to perform mathematical work on a range of cells, quickly and conveniently. They learn how to use some of the basic functions in Excel: SUM, COUNT, COUNTA, AVERAGE, MIN, and MAX. Functions provide a wide variety of pre-determined calculations for you to choose from, allowing you to easily perform a complex calculation and use it in your worksheet. So far, students have worked with mathematical and statistical functions. Financial functions, in contrast, are designed specifically for various finance tasks that you might want to work on.

Many Excel veterans use formulas to create subtotals. Subtotaling lets you more easily analyze large sets of data. You can specify ranges for subtotals even if the ranges are not contiguous. Students learn how to use the SUBTOTAL function applied to cell ranges and named ranges.

Students then learn that formulas, because of the sometimes-complex mathematics behind them, are prone to errors when you enter them manually. Fortunately, Excel provides easy-to-use tools to find and correct problems. They learn how to intentionally create an error, and then learn how to correct that error.

Lastly, students learn that when you audit the formulas in a worksheet, you might find it useful to print the worksheet with the formulas displayed. They learn how to display formulas for printing.

Key Terms

**argument** The parameters of a function.

**AutoSum** A formula that calculates (by default) the total from the adjacent cell through the first nonnumeric cell using the SUM function.

**AVERAGE function** A function that calculates (by default) the total from the adjacent cell through the first nonnumeric cell using the SUM function in its formula.

**COUNT function** A function that determines how many cells in a range contain a number.

**COUNTA function** A function that returns the number of cells in the selected range that contain text or values, but not blank cells.

**function** A predefined formula that performs a calculation.

**MAX function** A function that returns the largest value in a set of values.

**merged cells** Two or more cells combined into a single cell.

**MIN function** A function that determines the minimum value in a range of cells.

**NOW function** A function that returns today’s date and the current time, in the default format of mm/dd/yyyy hh:mm.

**PMT function** A function that requires a series of inputs regarding interest rate, loan amount (principal), and loan duration, and then calculates the resulting loan payment.

**SUBTOTAL function** A function that returns a subtotal for a list.

**SUM function** A function that totals all of the cells in a range.

**TODAY function** A function that returns the current date in a worksheet.

**trace arrow** An arrow that shows the relationship between formulas and the cells they refer to in order to resolve a formula error.

Solutions for Step-by-Step Exercises

The ***Practice Solution*** solution file is located in **Solutions/Lesson05** folder and is referenced in the following step-by-step exercises:

### Explore Functions

### Explore Dates

### Use the TODAY Function

### Use the NOW Function

The ***Budget Math Solution*** solution file is located in **Solutions/Lesson05** folder and is referenced in the following step-by-step exercises:

### Use the SUM Function

### Use the COUNT Function

### Use the COUNTA Function

### Use the AVERAGE Function

### Use the MIN Function

### Use the MAX Function

The ***Budget PMT Solution*** solution file is located in **Solutions/Lesson05** folder and is referenced in the following step-by-step exercises:

### Use PMT

The ***Budget Subtotals Solution*** solution file is located in **Solutions/Lesson05** folder and is referenced in the following step-by-step exercises:

### Select and Create Ranges for Subtotaling

### Build Formulas to Subtotal

### Modify Ranges for Subtotaling

The ***Budget Error Solution*** solution file is located in **Solutions/Lesson05** folder and is referenced in the following step-by-step exercises:

### Review an Error Message

### Trace a Formula and Remove Trace Arrows

The ***Budget Print Solution*** solution file is located in **Solutions/Lesson05** folder and is referenced in the following step-by-step exercises:

### Print Formulas

Answer Key

Knowledge Assessment

Multiple Choice

Select the best response for the following statements.

**1.** Which of the following calculates the total from the adjacent cell through the first nonnumeric cell by default, using the SUM function in its formula?

**a.** AVERAGE

**b.** AutoSum

**c.** COUNTA

**d.** MAX

**2.** The arguments of a function are contained within which of the following?

**a.** brackets

**b.** asterisks

**c.** commas

**d.** parentheses

**3.** When using the SUBTOTAL function, what is the function number for the SUM function?

**a.** 1

**b.** 4

**c.** 9

**d.** 11

**4.** You want to add a range of cells and then divide by the number of cell entries, determining the mean value of all values in the range. Which function do you use?

**a.** SUBTOTAL

**b.** AVERAGE

**c.** COUNT

**d.** PMT

**5.** Which of the following is *not* a required argument for the PMT function?

**a.** Fv

**b.** Rate

**c.** Nper

**d.** Pv

**6.** You want to calculate the number of non-blank cells in your worksheet. Which function do you use?

**a.** SUM

**b.** COUNT

**c.** COUNTA

**d.** MAX

**7.** You want to create a formula that calculates the number of years you have lived. You were born in 1991. Which of the following formulas is correct?

**a.** =YEAR(TODAY())-1991

**b.** =YEAR(TODAY())+1991

**c.** =YEAR(COUNT())-1991

**d.** =YEAR(COUNT())+1991

**8.** Which of the following statements accurately describes the default selection for AutoSum?

**a.** You must make the selection before clicking AutoSum.

**b.** By default, AutoSum totals all entries above the cell in which the formula is located, even if the cells contain a mix of numeric and nonnumeric content.

**c.** By default, AutoSum calculates the total from the adjacent cell through the first nonnumeric cell.

**d.** AutoSum does not have a default selection.

**9.** You want to sum multiple non-contiguous cell ranges that are named. Which of the following is best to use?

**a.** AutoSum

**b.** SUBTOTAL

**c.** MAX

**d.** MIN

**10.** The COUNT and SUM functions are examples of which functions?

**a.** text

**b.** statistical

**c.** financial

**d.** logical

True / False

Circle T if the statement is true or F if the statement is false.

**T F 1.** All functions require arguments within parentheses.

**T F 2.** Using functions helps to ensure the accuracy of a formula’s results.

**T F 3.** The TODAY function returns the current date in a worksheet.

**T F 4.** The AVERAGE function returns the number of cells in the selected range that contain text or values, but not blank cells.

**T F 5.** When functions take more than one argument, you should enter them in multiple sets of nested parentheses, separated by commas.

**T F 6.** In the PMT function, the Nper argument is the total number of payments for the loan.

**T F 7.** You can use a range in the SUBTOTAL function, but you cannot modify the range once it’s in use.

**T F 8.** A cell cannot be a trace dependent and a trace precedent for the same formula.

**T F 9.** You can refer to the TODAY and NOW functions in other formulas to perform calculations.

**T F 10.** To evaluate the error in the formula, select the Edit in Formula Bar option from the pop-up menu that appears after you click the warning icon.

Solutions for Competency Assessment

**Project 5-1**

The solution for Project 5-1 is named ***05 Game Stats Solution*** and is located in the **Solutions/Lesson05** folder.

**Project 5-2**

The solution for Project 5-2 is named ***05 Wingtip Toys Sales Solution*** and is located in the **Solutions/Lesson05** folder.

Solutions for Proficiency Assessment

**Project 5-3**

The solution for Project 5-3 is named ***05 Compare Payments Solution*** and is located in the **Solutions/Lesson05** folder.

**Project 5-4**

The solution for Project 5-4 is named ***05 Fine Art Formulas Solution*** and is located in the **Solutions/Lesson05** folder.

Solutions for Mastery Assessment

**Project 5-5**

The solution for Project 5-5 is named ***05 Coho Winery Stock Solution*** and is located in the **Solutions/Lesson05** folder.

**Project 5-6**

The solution for Project 5-6 is named ***05 Income Analysis Solution*** and is located in the **Solutions/Lesson05** folder.

Test Projects for Grading with OfficeGrader

The following test projects are designed for your to distribute directly to your students. Data and solution files are provided where required. The solution files are designed for grading with OfficeGrader.

Test Project 5-1

MOAC, Microsoft Excel Office 2013

Lesson 5, Using Basic Functions

Complete the following task:

1. **OPEN** the ***05 Payment*** workbook.

2. **SAVE** the document as ***05 Payment Calculator*** in your flash drive.

3. In cell B4, enter a formula that divides the value in B3 by 12.

4. In cell B6, key **30**.

5. In cell D6, enter a formula that multiplies the value in B6 by 12.

6. In cell B7, use the PMT function to calculate the monthly payment for a loan with the following parameters:

Rate: B4

Nper: D6

Pv: -B5 (in other words, a minus sign, followed by B5)

*(Hint: If you complete step 6 correctly, the value in B7 should be $898.09.)*

6. **SAVE** the document.

**CLOSE** the workbook. Leave Excel open.

Test Project 5-2

MOAC, Microsoft Excel Office 2013

Lesson 5, Using Basic Functions

Complete the following task:

1. **OPEN** the ***05 Errors*** workbook.

. **SAVE** the document as ***05 Errors Corrected***  in your flash drive.

2. Correct the problem with the formulas in B7:B93 that is preventing the item price from displaying correctly. The item price should be a calculated value obtained by multiplying the wholesale cost from column D by the multiplier in B2 and then adding the value in column D to it.

3. Correct the problem with the formulas in C7:C93 that is preventing the rebate amount from displaying correct. The rebate amount should be a calculated value obtained by multiplying the item price in column B by the rebate multiplier in cell B3.

4. In E7:E93, create a formula that calculates the net profit as the item price minus the rebate and the wholesale cost.

5. **SAVE** the workbook.

**CLOSE** the workbook. Exit Excel.