

Excel Lesson 4

Entering Worksheet Formulas

**Microsoft Office 2010
Introductory**

Objectives

- Enter and edit formulas.
- Distinguish between relative, absolute, and mixed cell references.
- Use the point-and-click method to enter formulas.
- Use the Sum button to add values in a range.

Objectives (continued)

- Preview a calculation.
- Display formulas instead of results in a worksheet.
- Manually calculate formulas.

Vocabulary

- absolute cell reference
- formula
- manual calculation
- mixed cell reference
- operand
- operator
- order of evaluation
- point-and-click method
- relative cell reference
- Sum button

What Are Formulas?

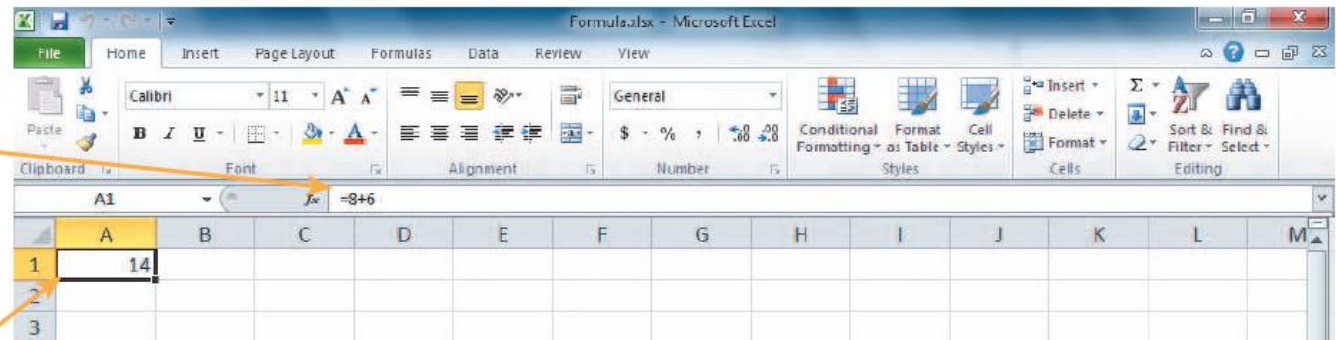
- The equation used to calculate values based on numbers entered in cells is called a formula.
- Each **formula** begins with an equal sign (=).
- The results of the calculation appear in the cell in which the formula is entered.

What Are Formulas? (continued)

- Formula and formula reset

Formula in the active cell appears in the Formula Bar

Formula results appear in the cell



Entering a Formula

- Worksheet formulas consist of two components:
 - operands
 - operators
- An **operand** is a constant (text or number) or cell reference used in a formula.
- An **operator** is a symbol that indicates the type of calculation to perform on the operands, such as a plus sign (+) for addition.

Entering a Formula (continued)

- Mathematical operators

OPERATOR	OPERATION	EXAMPLE	MEANING
+	Addition	B5+C5	Adds the values in cells B5 and C5
-	Subtraction	C8-232	Subtracts 232 from the value in cell C8
*	Multiplication	D4*D5	Multiplies the value in cell D4 by the value in cell D5
/	Division	E6/4	Divides the value in cell E6 by 4
^	Exponentiation	B3^3	Raises the value in cell B3 to the third power

Entering a Formula (continued)

- A formula with multiple operators is calculated using the **order of evaluation**.
 - Contents within parentheses (beginning with innermost) are evaluated first.
 - Mathematical operators are evaluated in a specific order. (Shown in table on next slide).
 - If operators have the same order of evaluation, the equation is evaluated from left to right.

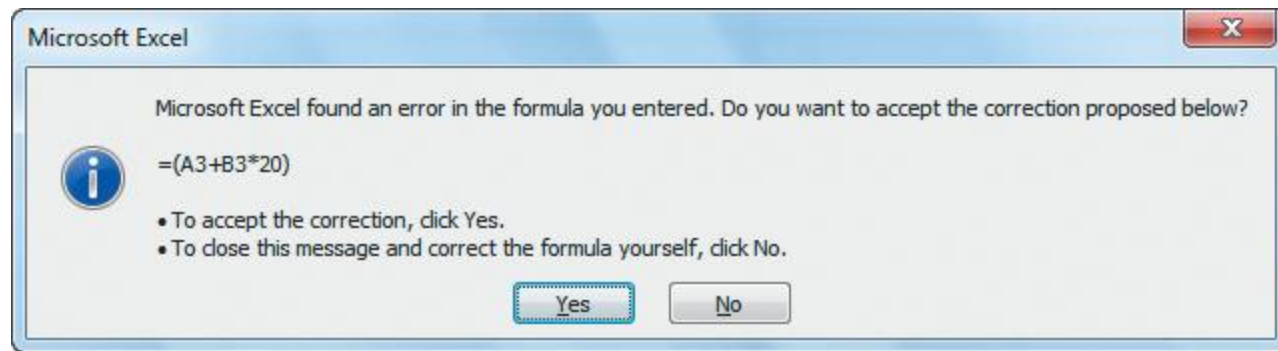
Entering a Formula (continued)

- Order of evaluation

ORDER OF EVALUATION	OPERATOR	SYMBOL
First	Exponentiation	^
Second	Positive or negative	+ or -
Third	Multiplication or division	* or /
Fourth	Addition or subtraction	+ or -

Editing Formulas

- If you enter a formula with an incorrect structure in a cell, Excel opens a dialog box that explains the error and provides a possible correction.



Formula error message

Editing Formulas (continued)

- If you discover that you need to make a correction, you can edit the formula.
- Click the cell with the formula you want to edit. Press the F2 key or double-click the cell to enter editing mode or click in the Formula Bar.

Comparing Relative, Absolute, and Mixed Cell References

- A **relative cell reference** adjusts to its new location when copied or moved to another cell.
- **Absolute cell references** do not change when copied or moved to a new cell.
- Cell references that contain both relative and absolute references are called **mixed cell references**.
 - References preceded by a dollar sign do not change.

Comparing Relative, Absolute, and Mixed Cell References (continued)

- Mixed cell references

Original formula with mixed cell references (relative column references and absolute row references)

	A	B
1		
2		
3	100	150
4	125	210
5	=A\$3+A\$4	
6		
7		=B\$3+B\$4

Relative column references shift based on new location of copied formula; absolute row references remain unchanged

Creating Formulas Quickly

- You can include cell references in a formula by using the **point-and-click method** to click each cell rather than typing a cell reference.
- Worksheet users frequently need to add long columns or rows of numbers. To use the **Sum button**, click the cell where you want the total to appear, and then click the Sum button.

Previewing Calculations

- When you select a range that contains numbers, the status bar shows the results of common calculations for the range.
- By default, these calculations display the average value in the selected range, a count of the number of values in the selected range, and a sum of the values in the selected range.

Previewing Calculations (continued)

- Summary calculation options for the status bar

CALCULATION	DESCRIPTION
Average	Displays an average of the values in the selected range
Count	Lists how many cells in the selected range contain values
Numerical Count	Lists how many of the cells in the selected range contain numbers
Minimum	Shows the smallest number in the selected range
Maximum	Shows the largest number in the selected range
Sum	Adds all the numbers in the selected range

Showing Formulas in the Worksheet

- At times you may find it simpler to organize formulas and detect errors when formulas are displayed in their cells.
- To do this, click the Formulas tab on the Ribbon, and then, in the Formula Auditing group, click the Show Formulas button. The formulas replace the formula results in the worksheet.

Calculating Formulas Manually

- When you need to edit a worksheet with many formulas, you can specify **manual calculation**, which lets you determine when Excel calculates the formulas.
- The Formulas tab on the Ribbon contains all the buttons you need when working with manual calculations.

Summary

- Formulas are equations used to calculate values and display them in a cell. Formulas can include values referenced in other cells of the worksheet. Each formula begins with an equal sign and contains at least two operands and one operator.
- Formulas can include more than one operator. The order of evaluation determines the sequence used to calculate the value of a formula.

Summary (continued)

- When you enter a formula with an incorrect structure, Excel can correct the error for you, or you can choose to edit it yourself. To edit a formula, click the cell with the formula and then make changes in the Formula Bar. You can also double-click a formula and then edit the formula directly in the cell.