

EXCEL

## 2

## Calculating Student Grades Using Formulas



**I**n this chapter, you will use Excel to work with multiple worksheets created to record student grades.

You will start by using formulas to calculate grade totals and grade percentages.

You will also learn about managing and organizing worksheets to insert, delete, and even hide data, and also to make your data easier to find.

**LEARNING OBJECTIVES**

- ▶ Use formulas to perform calculations
- ▶ Rearrange data on a worksheet
- ▶ Manage multiple worksheets

## Project: Tracking Student Grades

LearnFast College is a school that provides fast-paced learning programs for college students. As an instructor there, you need to keep track of your students' grades for an Introduction to Business course. Excel will help you record marks and quickly calculate final grades for the course using a variety of formulas.

## Creating Formulas

Excel uses formulas to perform calculations, which are written as mathematical problems. To create a formula, you should always begin by typing the equals (=) sign in the cell. Then you list the numbers or cells to use in the formula, along with the operation to be performed.

The Formula Bar always displays the formula while the cell displays the results.

The formula  $=2*250$  is entered in cell D2 and is displayed in the Formula Bar.

	A	B	C	D
1	Name	# of Guests	Price Per Person	Total
2	John Smith	2	250	500

The result of the formula, 500, is displayed in cell D2.

## Mathematical Operators

Addition, subtraction, multiplication, and division are frequently used to perform calculations in Excel. Knowing the correct keystroke for each operation is important to ensure the correct result for your formulas.

### KEYSTROKES FOR USING OPERATIONS IN FORMULAS

Operation	Keystroke	Example	Result
Addition	+	$=3+2$	5
Subtraction	-	$=3-2$	1
Multiplication	*	$=3*2$	6
Division	/	$=3/2$	1.5
Exponent	^	$=3^2$	9

## Cell References

Rather than typing numbers into your formulas, it is best to use **cell references** whenever possible. A cell reference takes the place of a number in a formula and makes it easier to copy formulas down a

column or across a row. So, instead of  $=2*250$ , you could use  $=B2*C2$  with the value 2 in cell B2, and the value 250 in cell C2.



View the video “Using Simple Formulas.”

D2			
A	B	C	D
1	Name	# of Guests	Price Per Person
2	John Smith	2	250

Formula bar:  $=B2*C2$

The formula in cell D2 references cells B2 and C2.

D2			
A	B	C	D
1	Name	# of Guests	Price Per Person
2	John Smith	2	250

Formula bar:  $=B2*C2$

The formula result is 500.

Cell references can be typed using upper- or lowercase letters, or you can simply click with the mouse on the cell you want to use.

Another advantage of cell references is that Excel automatically recalculates the formula if the value in the cell reference changes. In the preceding example, if the value in cell C2 is changed to 350, the formula in cell D2 would automatically update to show the new result, 700, without any effort required.

C2			
A	B	C	D
1	Name	# of Guests	Price Per Person
2	John Smith	2	350

Formula bar: 350

The formula result in cell D2 is updated immediately when cell C2 is changed.

## Order of Operations

When there is more than one operation in a formula, Excel must decide which operation to perform first. Excel follows the standard mathematical order of operations, commonly known by the acronym PEMDAS. That is, *Parentheses come first (also called brackets or round brackets), then Exponents, Multiplication, Division, Addition, and Subtraction*. PEMDAS is often remembered with the phrase “Please Excuse My Dear Aunt Sally.”



View the video “Understanding Order of Operations.”

It’s important to understand the order of operations because it can significantly change the outcome of your formula. The formula  $=2+3*5$  would result in 17 because  $3*5$  is the first operation and then  $2+15$  is 17. The formula  $=(2+3)*5$ , on the other hand, results in 25, because  $(2+3)$  is the first operation and then  $5*5$  is 25.



## DEVELOP YOUR SKILLS: E2-D1

In this exercise, you will create formulas to calculate the students' grades.

1. Start Excel, open **E2-D1-Grades** from your **Excel Chapter 2** folder, and save it as: **E2-D1-NewGrades**

The Security Warning bar may display the first time you open this or another file. In this course, you can safely click *Enable Content* to continue opening the file.

2. Select **cell F6**, type **=D6+E6**, and then tap **Enter**.

As you type each cell reference, Excel adds color to both the cell reference and the cell being referenced. The text D6 turns blue, and the cell has a border and light shading of the same color around it. As you continue typing the formula, the text E6 turns red. The color changes each time you add a new cell reference, which helps you visualize the cell references while entering or editing the formula.

You entered a formula that added the two quiz scores, and cell F6 should now show the total of 172. Now you will enter the next formula using the mouse instead of typing the cell references.

3. Type **=** in **cell F7**, click **cell D7**, type **+** and click **cell E7**, and finally click **Enter** .

The formula is similar, but this time the cell references refer to the information in row 7 and the result is 199. Notice that the formula is visible in the Formula Bar and the result is visible in the worksheet cell. Cell F6 uses cell references to cells D6 and E6, and cell F7 refers to cells D7 and E7, which means the relative position is the same and you can therefore use AutoFill to copy the formula down the column instead of manually entering it for each student.

4. Point to the fill handle in **cell F7** and drag down to **cell F17**.

The quiz totals are calculated for all students. Now you will calculate project totals for the class.

5. Select **cell J6** and then type **=H6+I6** and click **Enter** .

6. Point to the fill handle in **cell J6** and, this time, double-click it.

Double-clicking automatically fills the cells down the column according to the rows used in adjacent columns.

Next you will create a formula to calculate the percentage grade for projects by dividing the project total by 200.

7. Select **cell K6**, type **=** and click **cell J6** to select it, and then type **/200** and click **Enter** .

The mark has been calculated for the first student as 0.945, so next you will display it as a percentage. Then you will copy the formula down the column.

8. With cell K6 still selected, choose **Home**→**Number**→**Percent Style** .

9. Point to the fill handle in **cell K6** and double-click it to fill the formula down **column K**.

10. Save the workbook.

## Rearranging Data

When using a worksheet there may be times when you need to do more than simply enter data row by row. You may need to insert more information in the middle of existing data, remove chunks of data already entered, or move cells or entire sections of data around. You can also sort your data to put it into a more usable arrangement.

## Insert and Delete Rows, Columns, and Cells


To add more data into your existing data, it might make sense to insert a new cell, column, or row. You can add one cell, row, or column, at a time, or several at once. Columns are inserted to the left of your selected column, and rows are inserted above your selected row. Inserting a cell or cells allows you to shift the existing data either right or down.

☰ Home→Cells→Insert  | Right-click column/row heading→Insert

☰ Home→Cells→Delete  | Right-click column/row heading→Delete

### DEVELOP YOUR SKILLS: E2-D2

In this exercise, you will insert and delete both rows and columns, and insert cells to enter additional student data into the gradebook.


1. Save your workbook as: **E2 - D2 - NewGrades**
2. Select the cell with Sarah's name, **cell A16**, and choose **Home→Cells→Insert**  **menu button ▼→Insert Sheet Rows**.

The data for rows 16:17 is shifted down to rows 17:18, and a blank row is inserted in row 16, the currently selected row.

3. Enter the following data for a new student in **row 16**:

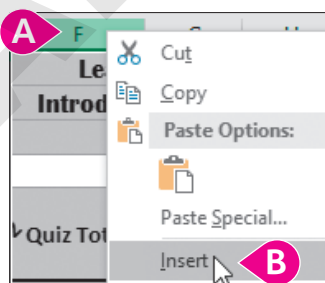
First	Last	Student ID#	Quiz 1	Quiz 2	Quiz Total	Quiz %	Project 1	Project 2	Project Total	Project %
Robert	Moreira	53846	96	88	184		90	95	185	93%

As you type in data, Excel automatically copies adjacent formulas. After entering the data for Quiz 1 and Quiz 2, the Quiz Total column should show 184 automatically; it's the result of the formula that adds the two quiz scores. After entering the two project marks, the total and percentage should also automatically calculate.

4. Select the cell with Todd's name, **cell A18**, and then choose **Home→Cells→Delete**  **menu button ▼→Delete Sheet Rows**.




All of Todd's information is removed from row 18. Now you need to add a third quiz score between columns E and F.

5. Follow these steps to insert a new column between **columns E** and **F**:



- A Right-click the **column F** heading.
- B Choose **Insert** from the menu.

A new column is entered where column F was, and column F is shifted right to become column G.

6. Select the cell with the *Quiz 2* heading, **cell E5**, and use the **fill handle** to drag one cell to the right, inserting the heading name **Quiz 3** into **cell F5**.  
*Because there are three quizzes now, the Quiz Total column formula needs to be updated to include the new quiz.*
7. Select **cell G6**, which contains the total formula for Quiz 1 and Quiz 2.
8. To edit the formula, point to the Formula Bar and click to the right of the **cell E6** reference. Then type **+F6** and click **Enter** .  

9. Point to the fill handle in **cell G6** and double-click to copy the new formula down **column G**.  
*Even though the Quiz 3 grades in column F are blank, the formulas in column G will include those results once they are entered. Now you will insert a single cell for a new column heading.*
10. Select the cell with the *Exam* heading, **cell M5**, and then choose **Home**→**Cells**→**Insert**  **menu button** ▼→**Insert Cells**.
11. In the Insert dialog box, choose **Shift Cells Right** and click **OK**.  
*The Exam heading is shifted to the right into cell N5.*
12. With cell M5 still selected, type **Participation** as the new heading and then complete the entry.
13. Select the **range M5:O5** and adjust the column width to **11.5** so the headings fit properly.
14. Save the workbook.

## Hide and Unhide Rows and Columns

Sometimes you may want to save data in your worksheet but have the information in certain rows or columns hidden from view. For example, a retailer might use an item's cost in one column to calculate the sale price in another. The cost column can be hidden from view to prevent customers from seeing how much profit the retailer is making, but the information is still saved and can still be used in a formula. Hidden rows and columns will not print, and a hidden row or column can easily be made visible using Unhide.

Hidden rows and columns can be identified by the gap in the column or row headings, as shown in the figure below:

	A	C
1		
3		


Row 2 and column B are hidden.

 Home→Cells→Format →Hide & Unhide | Right-click column/row heading→Hide/Unhide

## Sort Data by Column



Excel can easily sort data in either alphabetic or numeric order, using any column of data. For example, you might want to sort by name, date, item number, or dollar amount. A sort keeps any adjacent data in the same row, so sorting by name, for example, means that data, such as addresses or phone numbers, stays with the correct name.

Sorting options depend on the type of data selected. For example, if numerical data is selected, the options are Smallest to Largest or Largest to Smallest. If text is selected, the options are either A to Z or Z to A.



☰ Home→Editing→Sort & Filter 

## DEVELOP YOUR SKILLS: E2-D3

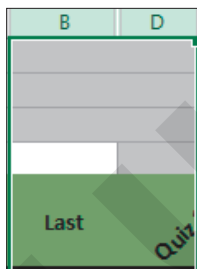
In this exercise, you will hide and unhide a column and then sort the students first by grade and then by first name.

1. Save your workbook as: **E2-D3-NewGrades**
2. Point to the **column C** heading, right-click, and choose **Hide**.  
*The Student ID# column is hidden from view, and now columns B and D are side by side.*
3. Select **cell L6** and then choose **Home→Editing→Sort & Filter →Sort Largest to Smallest **.


*The students are now listed from highest to lowest according to the Project % column, so John is now the first student listed, Pamela is listed last, and all of the corresponding grades for each student are sorted along with the student names.*

4. Select **cell A6** and choose **Home→Editing→Sort & Filter →Sort A to Z **.
5. Point to the **column B** heading, press and hold the left mouse button, and then drag to the right to select **columns B–D**.

*To unhide columns or rows, you must select a continuous range surrounding the hidden column or row, so be sure to drag rather than selecting each column separately.*



*After columns B–D are selected, there is no line separating the selected range.*

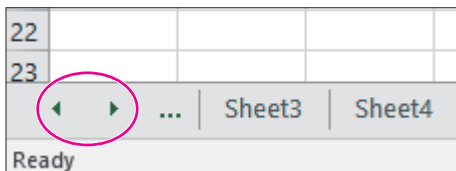
6. Choose **Home→Cells→Format →Hide & Unhide→Unhide Columns**.  
*Column C is once again displayed between columns B and D.*
7. Save the workbook.

## Managing Multiple Worksheets

By **default**, an Excel workbook contains one worksheet. You can, however, add multiple worksheets to be saved in the same workbook. This can make it easier to access different worksheets that are related to the same topic. You can also organize a workbook by deleting worksheets you don't need anymore, renaming the worksheets and changing the color of the sheet tab, and moving worksheets.

## Insert and Delete Worksheets

Adding a new worksheet is as simple as clicking on the New Sheet button at the bottom of a workbook. When a workbook contains many worksheets, you may need to scroll through the worksheets using the left and right arrows located to the left of the sheet tabs at the bottom of the screen.



To delete a worksheet, you have to be more careful because, once deleted, you can't recover any of the data. Even the Undo button can't recover a deleted worksheet. For protection, Excel does ask you to confirm the action before you delete a worksheet.

- ☰ Home → Cells → Insert  menu button ▼ → Insert Sheet | Right-click sheet tab → Insert...
- ☰ Home → Cells → Delete  menu button ▼ → Delete Sheet | Right-click sheet tab → Delete

## Rename Worksheets

The default names for worksheets don't really help someone understand what data is on the worksheet or what it is being used for. When you start adding more worksheets and need to quickly find the sheet with the information you need, it becomes important to name your sheets.

Names should be short and describe the purpose of the worksheet as clearly as possible. Certain characters, such as ? and /, are restricted, so it is best to stick to text and numbers. To rename a sheet, simply double-click the sheet tab and type the new name.



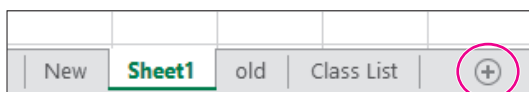
Examples of good worksheet names that are short, simple, and descriptive

- ☰ Home → Cells → Format → Rename Sheet | Double-click the sheet tab

### DEVELOP YOUR SKILLS: E2-D4

*In this exercise, you will insert a new sheet, delete a sheet, and rename a sheet.*



1. Save your workbook as: **E2-D4-NewGrades**
2. Click the **New Sheet** button:



*Notice there is a new worksheet inserted to the right of the active sheet, New. The default worksheet name is Sheet with a number, which increases each time you add a new sheet.*

3. Click the **old** worksheet tab to activate the sheet.



4. Choose **Home**→**Cells**→**Delete**  **menu button** ▼→**Delete Sheet** and click **Delete** or tap **Enter** when prompted in the dialog box.  
*Because there is data on the old worksheet, Excel asks you to confirm before it will delete and permanently remove the sheet. This step cannot be undone.*
5. To change the sheet name, double-click the **Sheet1** worksheet tab you just created; type **Participation** and tap **Enter**.
6. Repeat step 5 to change the name of the **New** worksheet to: **Final Grades**
7. On the **Final Grades** worksheet, select the title in the merged **cell A2** and press **Ctrl**+**C** to copy the text *Introduction to Business*.
8. Click the **Participation** worksheet tab, ensure **cell A1** is the selected cell, and press **Ctrl**+**V** to paste the text.
9. In **cell A2**, below the class title, type **Participation Grades** and tap **Enter**.
10. Select **cell A1**, choose **Home**→**Clipboard**→**Format Painter** , and then click **cell A2** to apply the formatting from cell A1.  
*Clicking Format Painter once allows you to apply the formatting once, and then it is turned off. If you wanted to continue applying the same formatting to more cells or ranges, you would double-click the Format Painter instead.*  
*The range A2:O2 is merged and centered, and the text now has the same formatting as the title.*
11. Save the workbook.

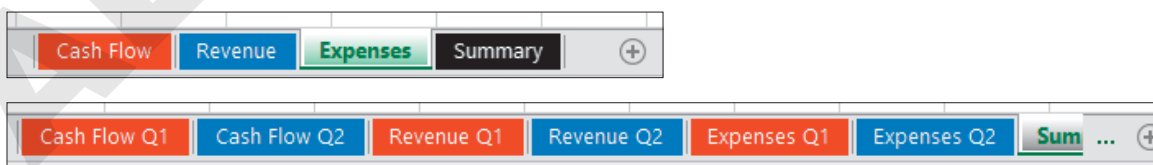
## Move Worksheets

You may want to rearrange the order of the sheets at the bottom of the workbook. Excel doesn't have a feature for sorting worksheets, but you can drag worksheet tabs left or right to rearrange the order. You can also rearrange or duplicate the sheets using the Move or Copy dialog box.

 Home→Cells→Format→Move or Copy Sheet | Right-click worksheet tab→Move or Copy

## Change Worksheet Tab Colors

Finding the right worksheet can be a lot quicker if you use a system of colors for different worksheets. Colors could be assigned based on department, function, importance, or any method you choose. Adding a color to a worksheet tab can be done via the Ribbon or by right-clicking the tab.



These are some examples of using tab colors to organize worksheets; notice the selected worksheet appears only lightly shaded.

 Home→Cells→Format→Tab Color | Right-click worksheet tab→Tab Color

## Hide Worksheets

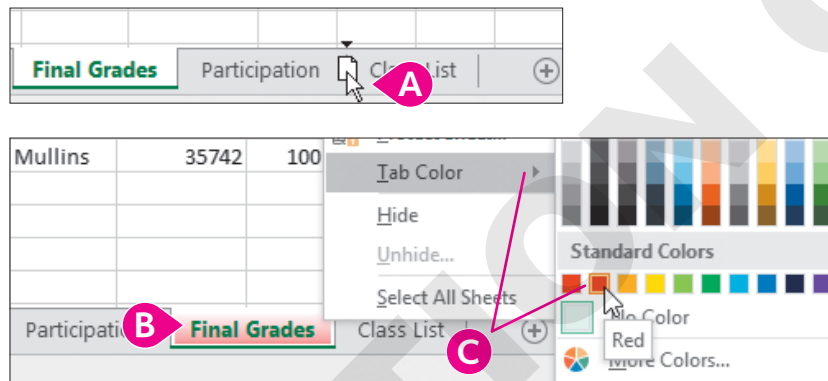
Similar to hiding rows and columns, you may want to save a worksheet's information but have it hidden from view. Hiding a worksheet can also help organize your workbook if you have a lot of tabs or if the end-user will use only some of the worksheets. In this case, hiding the unused worksheets makes it a more user-friendly workbook. Once hidden, it is easy enough to unhide a worksheet when you need to use it again.

☰ Home→Cells→Format→Hide & Unhide | Right-click worksheet tab→Hide/Unhide

### DEVELOP YOUR SKILLS: E2-D5

In this exercise, you will reorganize and color the worksheet tabs.

1. Save your workbook as: **E2-D5-NewGrades**
2. Follow these steps to move the Final Grades worksheet and add a tab color:



- A Drag the **Final Grades** worksheet tab to the right side past the Participation sheet, as shown.  
*Notice the small black arrow that follows your mouse pointer to indicate the new position of the sheet you are moving.*
  - B Right-click the **Final Grades** worksheet tab.
  - C Choose **Tab Color**→**Standard Color Red**.
3. Change the color of the **Participation** sheet tab to **Standard Color Blue**.  
*The Class List worksheet is not needed at this time, so you will hide it.*
4. Right-click the **Class List** worksheet tab and choose **Hide**.
5. Save the workbook.

## Create Cell References to Other Worksheets

When using multiple worksheets, you can use common information across different sheets. Excel allows you to **link** cells from different worksheets in the same workbook or in other workbooks. Linking inserts values from a source worksheet into a destination worksheet. For example, you may want to have a revenue worksheet and a profit worksheet; the profit worksheet can use the values from the revenue worksheet. If the revenue worksheet values ever change, the profit worksheet values will update automatically.

Referencing another worksheet requires the actual cell reference as well as the worksheet name and an exclamation point. Cell references to other workbooks require the workbook name, sheet name, and cell reference. Cell references to other worksheets or workbooks can be used to simply link the data or can be used in a formula.

*Revenue is the name of the worksheet in the current workbook, followed by an exclamation point.*

`=Revenue!A3`

*A3 is the cell reference on the Revenue worksheet.*

*In this example, the Revenue worksheet is in a different workbook, and the name of the workbook, 2015Financial.xlsx, is placed inside square brackets.*

`=[2015Financial.xlsx]Revenue!A3`

It is possible to manually type a cell reference to another worksheet or workbook; however, it is simpler and much more accurate to use the point-and-click method. If you point and click, Excel inserts all the necessary formatting, such as brackets and exclamation points.

## DEVELOP YOUR SKILLS: E2-D6

*In this exercise, you will use linking formulas to add student names to a worksheet.*

1. Save your workbook as: **E2-D6-NewGrades**
2. Click the **Participation** worksheet tab to activate that worksheet, and then select **cell A4**.
3. Enter the heading **First** in **cell A4**, tap **[Tab]**, enter the heading **Last** in **cell B4**, and tap **[Enter]**.
4. In **cell A5**, type **=** and then click the **Final Grades** worksheet tab.

*You are now looking at the Final Grades worksheet but notice that the Formula Bar shows the beginning of the formula you are entering on the Participation worksheet, including the Final Grades worksheet name.*

*Excel adds single quotes around any worksheet name that contains a space.*

5. Select **cell A6** and then click **Enter**  on the Formula Bar.

### Warning!

*Completing the entry this way and not clicking the Participation worksheet tab is very important, because doing so would change your formula. Completing the entry instantly brings you back to the Participation worksheet. You will now see the name Ashley in cell A5 and the formula =Final Grades!A6 in the Formula Bar.*

6. With cell A5 still selected, use the **fill handle** to drag one cell to the right, inserting the last name for Ashley into **cell B5**.
7. With the range A5:B5 selected (the cells with Ashley's first and last name), drag the **fill handle** down to **row 16**.

*The names for all twelve students are now added to the Participation worksheet, and if the names are edited on the Final Grades worksheet, changes will automatically be updated on the Participation worksheet. Felecia has informed the school the correct spelling of her name is "Felicia," so you will update this now.*

8. Go to the **Final Grades** sheet and select **Felecia** in **cell A10**.
9. Edit the name by double-clicking, deleting the second *e*, and typing an **i**, and then complete the entry.
10. Go back to the **Participation** worksheet and notice Felicia's name has now been updated in **cell A9**.

4	First	Last
5	Ashley	Ronayne
6	Atif	Khalil
7	Austin	Farrell
8	Crystal	Robinson
9	Felicia	Murray
10	Jessica	McInnis

11. Save the workbook.

## Create a Copy of a Worksheet

Rather than starting with a new, blank worksheet, you can save a lot of time by using an existing worksheet that already has some of the information you need or has the structure and formatting you want. Creating a copy of a worksheet does not affect the original worksheet. The new worksheet will have the same name but with (2) added to the end to indicate it is a second version.

☰ Home → Cells → Format → Move or Copy Sheet | Right-click worksheet tab → Move or Copy

## Edit Multiple Sheets at One Time

It is also possible to select several worksheets at the same time. With multiple sheets selected you can modify all of the selected sheets simultaneously by making changes on just one sheet. When you edit one, the others update automatically. You can enter text or formulas, or change cell format in the same cell in all of the selected sheets simultaneously. You need to be very careful with this feature, however, to ensure you are not replacing existing data in one of the worksheets you can't see!

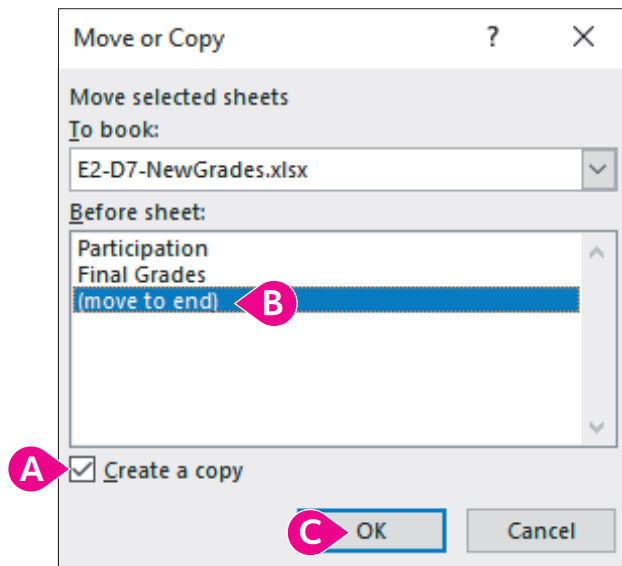
Multiple sheets can be selected (or grouped) by holding the **Ctrl** key while clicking additional sheet tabs. For consecutive sheets, you can also hold the **Shift** key and click the last sheet you wish to select. To deselect (or ungroup) the multiple worksheets, either select a different sheet or right-click one of the sheet tabs and choose Ungroup Sheets.

### DEVELOP YOUR SKILLS: E2-D7

*In this exercise, you will create a new worksheet by copying the Participation sheet and make changes to both at once.*

1. Save your workbook as: **E2-D7 -NewGrades**
2. Right-click the **Participation** worksheet tab and choose **Move or Copy**.

3. Follow these steps to copy the sheet and position it at the end of the workbook:



- A** Click the checkbox to select **Create a Copy**.
- B** In the Before Sheet box choose **(move to end)**.
- C** Click **OK**.

The new worksheet is created to the right of the Final Grades sheet; it is identical to Participation and named Participation (2).

4. Right-click the **Participation** sheet tab again and choose **Move or Copy**.
5. This time *do not* click the Create a Copy box. In the Before Sheet box choose **Participation (2)** and **OK**.

The original Participation sheet is now positioned to the right of the Final Grades sheet and before the Participation (2) sheet.

6. Double-click the **Participation (2)** sheet tab; rename it **Exam** and tap **[Enter]**.

Your sheet tabs should now look like this:



7. With the Exam sheet still active, select the merged **cell A2** and double-click the word **Participation** in the Formula Bar.

This method of editing cell contents allows you to replace part of the cell without retyping the whole thing.

8. Type **Exam** and complete the entry, so the subtitle in **cell A2** now reads Exam Grades.

## Edit Multiple Sheets at Once

Now you will select both the Participation and Exam worksheets to edit them both at once because you want the same changes applied to both.

9. With the Exam worksheet still active, press and hold the **[Ctrl]** key and click the **Participation** worksheet tab.

Both worksheets are now selected, their names are both bold, and there is a thick line below both sheet tabs. The Final Grades worksheet is not selected.





10. With both sheets selected, select the **range A4:B4**.
  11. Apply bold formatting, increase the font size to 12 points, and center-align the content.
  12. Add a **Thick Bottom Border** and the fill color **Green, Accent 6, Lighter 40%** (last column, fourth row).
  13. Click the **Participation** worksheet tab to confirm your changes were made to both sheets and then click the **Final Grades** worksheet tab to deselect the other two sheets.
  14. Save the workbook and close Excel.
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## Self-Assessment



Check your knowledge of this chapter's key concepts and skills using the Self-Assessment in your ebook or online (eLab course or Student Resource Center).

# Reinforce Your Skills

## REINFORCE YOUR SKILLS: E2-R1

### Use Formulas to Calculate Reimbursement

In this exercise, you will create a copy of a worksheet that Kids for Change used to calculate expense reimbursements paid out to volunteers in 2019 and update the sheet for 2020.

- Start Excel, open **E2-R1-Volunteers** from your **Excel Chapter 2** folder, and save it as: **E2-R1-Volunteers2020**  
Because many of the volunteers are the same each year, and you want to use the same basic structure for the worksheet, it is easier to create a copy than to start all over.
- Create a copy of the 2019 sheet and rename it as: **2020**  
The 2019 sheet did not use formulas for the calculations, so the data can be deleted. However, after your sheet contains the proper formulas, you can delete the input data only, leaving the formulas under Mileage Paid and Total for the next year's calculations.
- On the **2020** sheet, delete all data from 2019 for Miles Driven, Mileage Paid, Other Expenses, and Total in the **range B5:E10**.
- Cheryl did not volunteer this year, so delete **row 7** from the worksheet.
- There is a new volunteer in 2020, so enter the name **Jessica Banderas** in **cell A10**.
- Enter the mileage data shown for the corresponding volunteers:

	Name	Miles Driven
4		
5	Dave Lozano	80
6	Sharon Foster	173
7	Brad Bird	96
8	Michelle Smith	164
9	Stewart Schott	205
10	Jessica Banderas	104

- Sort the volunteers on the Miles Driven column, from smallest to largest.
- Select **cell C5** to enter the formula to calculate the mileage paid for Dave.
- Type **=B5\*0.2** and click **Enter** .
- Click the **fill handle** in **cell C5** and drag down to **cell C10**.  
The data for the Other Expenses column has not been entered yet, but the formula to calculate the total can be created and the expenses entered later.
- Select **cell E5** and then enter the formula **=C5+D5** and click **Enter** .
- Double-click the **fill handle** in **cell E5** to fill the formula down to **cell E10**.
- Point to the column heading for **column B**, right-click, and choose **Hide**.
- Save the workbook.

## REINFORCE YOUR SKILLS: E2-R2

### Edit Multiple Sheets and Insert Formulas

*In this exercise, you will edit both sheets and then use a formula to update the Mileage Rate column from last year to this year.*

1. Save your workbook as: **E2-R2-Volunteers2020**

*You want the mileage rate to be listed at the bottom of each worksheet, so you will edit both sheets at once.*

2. Make sure the 2020 worksheet is active and then press and hold **Ctrl** while clicking the **2019** worksheet tab.
3. In **cell C14**, type **Mileage Rate:** and tap **Tab**.
4. In **cell D14**, type **0.2** and tap **Enter**.
5. Select the **range C14:D14** and apply bold, italics, and Wrap Text formatting.
6. Right-click the **2020** worksheet tab and select **Ungroup Sheets** to stop editing both sheets at once.

*You have been informed that the rate will be increased by 10% from last year, so you will use a formula to calculate the new rate. The cell contents do not have to be deleted first; simply start typing the new information to replace the existing information in any cell.*

7. Select cell **D14**, type **=** to begin the formula, select the **2019** sheet, select **cell D14**, type **+** and then select **cell D14** again. Finally, type **\*10%** and complete the entry. (The entire formula should be **=2019!D14+2019!D14\*10%** and the result should be 0.22.)
8. Change the **2020** sheet tab color to red.
9. Hide the **2019** sheet now that you are finished with it.
10. Save and close the workbook.

## REINFORCE YOUR SKILLS: E2-R3

### Format Worksheets and Create Formulas with Functions

*In this exercise, you will calculate the Kids for Change employee contributions to an employee retirement savings fund, setting up the appropriate functions, and copy the worksheet to use again the following year.*

1. Open **E2-R3-Savings** from your **Excel Chapter 2** folder and save it as: **E2-R3-Savings2020**
2. On the **2019** sheet, begin calculating the total annual contributions for each employee by adding the amount for Jan–Jun and the amount for Jul–Dec.
3. Apply bold and the Currency number format to the totals, and click the **Decrease Decimal** button enough times to entirely remove the decimal places.
4. Select the **2018** and the **2019** sheets to edit both at once.
5. Insert a new row above *Shannon* and then enter the name **Ruth Bowers** on the new blank row, in **cell A9**.
6. Ungroup the sheets and choose the **2019** worksheet.

7. Enter Ruth's contributions: **0** under Jan-Jun and **150** under Jul-Dec.  
*Notice Excel enters the formula under Annual Total for you.*
8. Enter the column heading **Running Total** in **cell E4** and enter a formula in **cell E5** to find the annual total for Craig from 2019 plus the amount from 2018.
9. Copy the formula down **column E** for the rest of the employees.
10. Use **Autofit** in **column E** to widen the column enough to fit the heading.
11. Hide the row with Shannon's information, **row 10**.
12. Insert a new column to the left of **column E**, and in **cell E4** type **Percent** and center-align the headings in the **range A4:F4**.
13. In **cell E5**, enter a formula that divides the annual total by the running total.
14. Apply the Percentage number format to **cell E5** and copy the formula down the column.
15. Create a copy of the **2019** worksheet and rename the new worksheet: **2020**
16. If necessary, move the **2020** worksheet to the right of the 2019 worksheet.
17. On the **2020** sheet, delete all the data from the **range B5:C11**.
18. Edit the running total formula in **cell F5** so that on this sheet it adds the annual total in **cell D5** and the 2019 running total.
19. Copy the new running total formula down the column to **cell F11**.  
*The 2020 sheet is now ready to use. Once data is added for Jan-Jun and Jul-Dec, the formulas will update in columns D, E, and F.*
20. Save the workbook and close Excel.

## Apply Your Skills

### APPLY YOUR SKILLS: E2-A1

#### Create Formulas to Calculate Prices

*In this exercise, you will use an existing set of prices for Universal Corporate Events services to create an updated price list.*

1. Start Excel, open **E2-A1-Prices** from your **Excel Chapter 2** folder, and save it as: **E2-A1-NewPrices**  
*You will begin by creating a copy of the Price List sheet to be saved and hidden for future reference, and then editing the original sheet.*
2. Create a copy of the **Price List** sheet and rename it: **Old Price List**
3. Hide the **Old Price List** sheet.
4. On the **Price List** sheet, insert a row above **row 3**.  
*Inserting a blank row separates the data from the titles and allows the data to be sorted more easily.*
5. Sort the Service Price List by price, from largest to smallest.
6. Insert a column to the left of the Deposit column.
7. In **column C**, enter the heading **Increase** and in **cell C5** enter the number: **5**
8. Insert another blank column to the left of the Deposit column.
9. In **column D**, enter the heading **New Price** and in **cell D5** enter a formula that adds the Increase column amount to the Price column amount.
10. Select **cell C5** and **cell D5** and drag the **fill handle** down to **row 12**.
11. Use the AutoFill Options Copy Cells command to copy the number 5, as well as the formula, all the way down both columns.
12. Hide **columns B** and **C** so they are hidden from customers, leaving only the New Price and Deposit columns visible for each service.
13. Save the workbook.

### APPLY YOUR SKILLS: E2-A2

#### Use Formulas to Calculate a Discount

*In this exercise, you will add formulas to the Universal Corporate Events price sheet to calculate the new prices for your important customers.*

1. Save your workbook as: **E2-A2-NewPrices**  
*There is a hidden sheet that does not use formulas, so it needs to be updated.*
2. Unhide the existing **VIP Price List** worksheet.
3. Change the tab color of the **VIP Price List** worksheet to red.
4. Edit the Price List and VIP Price List at the same time to hide Venue selection from the Services list.
5. Ungroup the sheets. On the **VIP Price List** sheet, delete the list of prices in **column B**.
6. Edit **cell B4** to: **VIP Price**



- In **cell B5** enter a formula that subtracts a VIP discount of 10% from the New Price column on the **Price List** worksheet.

*There are different methods to mathematically subtract 10% and achieve the correct result of 356 in cell B5. One method is to use `=Price List!D5*(100%-10%)`, which multiplies the New Price listed on the Price List sheet by 100%, the full amount, less 10%, the discount amount.*

- Copy the VIP Price formula down to **row 12**. Apply the Currency number format and bold to the **range B5:B12**.
- Hide the **VIP Price List** worksheet so it can only be shown to VIP customers.
- On the **Price List** worksheet, apply bold and the Currency number format to the **range D5:D12**.
- Save and close the workbook.

## APPLY YOUR SKILLS: E2-A3

### Create Financial Projections Using Formulas

*In this exercise, you will calculate the profit or loss for the first six months of the year for Universal Corporate Events, and then create projections for the next six months on a new sheet.*

- Start Excel, open **E2-A3-Profit** from your **Excel Chapter 2** folder, and save it as: **E2-A3-ProfitProjections**
- Create a copy of **Sheet1** and move it to the end.
- Rename Sheet1 to **Q1&Q2 Results** and then rename the copy to: **Q3&Q4 Projections**
- On the **Q3&Q4 Projections** sheet, delete all data in the **range B7:G14**.
- In **cell A2**, add the word **Projections** to the end of the existing text.
- Edit **cell A3** to: **Q3 & Q4**
- Enter the proper headings for **Q3** and **Q4** in **row 5** and the months **Jul** to **Dec** in **row 6** (use AutoFill to do it faster).  
*You are projecting revenue to increase by 5% and to cut expenses by 2%, so you will use formulas to determine the projections for Q3 and Q4.*
- In **cell B7**, use a formula that multiplies the amount of Revenue from Jan on the **Q1&Q2 Results** sheet by 105% (this represents an increase of 5% over the amount from January).
- Copy the formula across the row for the other five months.
- In **cell B10**, enter a formula that multiplies the amount of Employee Wages from Jan on the **Q1&Q2 Results** sheet by 98% (this represents a decrease of 2% from the amount in January).
- Copy the formula down to **row 14** for the three other expenses as well as the total, use Auto Fill Options to Fill Without Formatting to keep a line above Total Expenses, and then copy across all six months.
- Select the **Q1&Q2 Results** and **Q3&Q4 Projections** sheets and use a formula in **row 16** to find the profit or loss for each month on both sheets at once. (Hint: Use Revenue–Total Expenses, starting in **cell B16** and copy across to **cell G16**.)
- With both sheets still selected, apply bold and the Accounting number formatting to all numbers in **row 16** and then just the Accounting number format in **row 7**.
- Apply Comma Style number format to the **range B10:G14** and then ungroup the worksheets.
- Save the workbook and close Excel.

# Project Grader

If your class is using eLab ([labyrinthelab.com](http://labyrinthelab.com)), you may upload your completed Project Grader assignments for automatic grading. You may complete these projects even if your class doesn't use eLab, though you will not be able to upload your work.

## PROJECT GRADER: E2-P1

### Adding Inventory for Other Locations

You've been asked to enhance an inventory spreadsheet for Taylor Games. In this exercise, you will make various enhancements to allow the worksheet to track a specific group of SKUs at two locations.

- Download and open your Project Grader starting file.
  - Using eLab: Download **E2\_P1\_eStart** from the Assignments page. You *must* start with this file or your work cannot be automatically graded.
  - Not using eLab: Open **E2\_P1\_Start** from your **Excel Chapter 2** folder.

2. Delete **Sheet3**.

3. In **Sheet 1**, remove **rows 2** through **6**.

4. Hide **column B** in both **Sheet1** and **Sheet2**.

5. Rename the worksheets as follows:

Sheet1	<b>Seattle Store</b>
Sheet2	<b>Warehouse</b>

6. Change the worksheet order by moving the **Warehouse** worksheet to the left of the Seattle Store worksheet.

7. Change the tab colors of both worksheet tabs as follows:

Warehouse tab	<b>Orange, Accent 2</b> (6th color in the top row of Theme colors)
Seattle Store tab	<b>Blue, Accent 1</b> (5th color in the top row of Theme colors)

8. Sort both worksheets on the **SKU #** field in smallest to largest order.

9. In both worksheets, insert a column to the left of the Markup % column.

10. Make these changes in both of the new columns (**column F**):

- Enter the heading **Inventory Value** in **cell F3**.
- Set the column widths to: **15**

11. In **cell F4** of both worksheets, use cell references to create a formula that multiplies the Quantity by the Unit Cost (Quantity \* Unit Cost).

12. In both worksheets, copy the formula in **cell F4** down the column to the **range F5:F18**.

13. Make the following changes in both worksheets:

- In **cell H3**, enter the heading text: **Markup Amount**
- In **cell I3**, enter the heading text: **Retail Value**
- Set the widths of **columns H** and **I** to: **15**
- Apply the same formatting that is used in **cell G3** to **cells H3** and **I3**.

14. In **cell H4** of both worksheets, use cell references to create a formula that multiplies the Inventory Value by the Markup % (Inventory Value \* Markup %).
15. In both worksheets, copy the formula in **cell H4** down the column to the **range H5:H18**.
16. In **cell I4** of both worksheets, use cell references to create a formula that adds the Inventory Value to the Markup Amount (Inventory Value + Markup Amount).
17. In both worksheets, copy the formula in **cell I4** down the column to the **range I5:I18**.
18. In the **range H4:I18**, in both worksheets, format the cells with the Accounting number format.
19. Make a copy of the **Warehouse** sheet using these guidelines:
  - Choose **(move to end)** on the Before Sheet list.
  - Change the sheet name of the new sheet to: **Warehouse (Backup)**
20. Make a copy of the **Seattle Store** sheet using these guidelines:
  - Choose **(move to end)** on the Before Sheet list.
  - Change the sheet name of the new sheet to: **Seattle Store (Backup)**
21. Hide both the **Warehouse (Backup)** and **Seattle Store (Backup)** sheets.
22. Save your workbook.
  - *Using eLab:* Save it to your **Excel Chapter 2** folder as **E2\_P1\_eSubmission** and attach the file to your eLab assignment for grading.
  - *Not using eLab:* Save it to your **Excel Chapter 2** folder as: **E2\_P1\_Submission**

## PROJECT GRADER: E2-P2

### Classic Cars Appreciation in Car Value

*You've been asked to modify an existing worksheet to determine how much members' cars have appreciated in value since their original sales price. In this exercise, you will add a new worksheet in which you will focus on the task at hand.*

1. Download and open your Project Grader starting file.
  - *Using eLab:* Download **E2\_P2\_eStart** from the Assignments page. You *must* start with this file or your work cannot be automatically graded.
  - *Not using eLab:* Open **E2\_P2\_Start** from your **Excel Chapter 2** folder.
2. Make a copy of the **Sheet1** worksheet, moving the copy to the end of the worksheet order.
3. Change the worksheet names as follows:
  - Change the new sheet's name to: **Car Values**
  - Change the Sheet1 name to: **New Members**
4. Make these settings in the **Car Values** sheet:
  - Hide **columns G** and **H**.
  - Unhide **columns J** and **K**.
5. In **cell L4**, enter the heading: **Appreciation**
6. Apply the cell formatting from **cell K4** to **cell L4**.
7. Set the width of **column L** to: **16**
8. In **cell L5**, use cell references to create a formula that calculates the Appreciation (Current Value – Original Value).

9. Format **cell L5** with the Currency number format and then decrease the decimals so that no decimals are displaying.
10. Copy the formula in **cell L5** down the column to the range **L6:L34**.
11. Sort the worksheet on the Appreciation field in largest to smallest order.
12. In the **New Members** sheet, insert a row above **row 4**.
13. In **cell A3**, enter the text: **Greatest Appreciation**
14. In **cell C3** of the **New Members** sheet, create a link to **cell L5** in the **Car Values** sheet. **Cell C3** should now display the value from **cell L5** in the Car Values sheet.
15. Format **cell C3** with the Currency number format and then decrease the decimals so that no decimals are displaying.
16. Apply bold formatting to **cells A3** and **C3**.
17. Save your workbook.
  - *Using eLab:* Save it to your **Excel Chapter 2** folder as **E2\_P2\_eSubmission** and attach the file to your eLab assignment for grading.
  - *Not using eLab:* Save it to your **Excel Chapter 2** folder as: **E2\_P2\_Submission**

## Extend Your Skills

*These exercises challenge you to think critically and apply your new skills in a real-world setting. You will be evaluated on your ability to follow directions, completeness, creativity, and the use of proper grammar and mechanics. Save files to your chapter folder. Submit assignments as directed.*

### E2-E1 That's the Way I See It

Open **E2-E1-HousePurchase** and save it as: **E2 - E1 - HousePurchase2**

You are a real estate agent, and you want to create a list of potential real estate purchase costs for your clients. The types of purchasing costs and the current rate for each are listed, and you need to enter the appropriate formulas. Enter the price for a house you might wish to buy, using the Internet as necessary to research housing prices in your area. Then create formulas in all of the cells with gray shading to find total Mortgage Plus Fees. Start with the Rate times the Price in column C, then take Price minus Down Payment to get the Mortgage Amount. Then add the two Variable Fees together, add that result plus the Flat Fees to get Total Fees, and add Total Fees to Mortgage Amount in cell D19. When you are done, apply appropriate cell and number formatting as desired. Rename the sheet **Customer 1** and make a copy of it named **Customer 2**. On the Customer 2 sheet, delete the price but leave all formulas in place.

### E2-E2 Be Your Own Boss

Information has been gathered from the Blue Jean Landscaping corporate customer invoices for Quarter 1 (Q1), and you need to calculate total Q1 revenue and make revenue projections for Q2. One of your employees has started the file but needs your expertise in creating the formulas. Open **E2-E2-Revenue** and save it as: **E2 - E2 - Projections**. You are required to enter appropriate formulas to calculate total labor (hours times labor rate) and the total invoice (materials plus total labor). Some of the columns are hidden, so you must unhide them first. Then calculate Q2 projections by multiplying the total invoice by the expected Q2 growth rate. Last, clean up your worksheet by deleting the companies with zero material and hours, hide the Labor Rate and Q2 Growth Rate columns again, and sort the companies by the Total Invoice column from smallest to largest.

### E2-E3 Demonstrate Proficiency

Stormy BBQ is known for its delicious, world-famous BBQ sauce. In addition to its restaurant business, the company started selling its sauce by the bottle last year and want to know how profitable it was. Open **E2-E3-SauceSales** and save it as: **E2 - E3 - SauceProfit**. The first step is to calculate Revenue in the appropriate column by multiplying the number of bottles by the price per bottle. Then for expenses, use number of bottles times the expense per bottle. Last, find the profit by subtracting expenses from revenue. Once you have the profit calculated, you can hide the two columns with price and expense per bottle. Make a copy of the sheet and rename the two sheets with an appropriate year; the current sheet should be this year and the copy should be next year. On next year's worksheet, clear the sales entered under Number of Bottles Sold, so the sales can be entered in after each month of the following year. Make any other formatting changes you see fit.