

## Concepts Review

### True/False Questions

Each of the following statements is either true or false. Indicate your choice by circling T or F.

- T F 1. Error checking finds and corrects formula errors.
- T F 2. A highlight cells rule works with error checking to identify special formats.
- T F 3. The multiplication symbol in a formula is /.
- T F 4. The page orientation depends on the cell orientation.
- T F 5. You can control the order of precedence in a formula with parentheses.
- T F 6. Division is calculated before addition in a formula without parentheses.
- T F 7. A 3-D reference is a cell address on another worksheet in the workbook.
- T F 8. An absolute reference does not adjust when the formula is copied to another cell.

### Short Answer Questions

Write the correct answer in the space provided.

1. What is the keyboard shortcut to display or hide formulas?

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2. Which page orientation is taller than it is wide?

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3. How would the cell reference  $\$F\$3$  be described?

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4. How would the cell reference  $Sheet!B4$  be described?

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5. What type of operation is being performed in the formula  $=A4*B4$ ?

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6. What group on the Page Layout tab provides options for printing a large worksheet on an index card?

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## EX-176

## UNIT 2 Working with Formulas and Functions

7. Describe how this formula would be calculated:  $=(B4+C4)/D1$
- 

8. How could you find cells that have a highlight cells rule applied?
- 

### Critical Thinking

Answer these questions on a separate page. There are no right or wrong answers. Support your answers with examples from your own experience, if possible.

- How is scaling the worksheet different from changing the zoom size? Describe when you might use each feature.
- Why is it necessary to have an absolute cell reference in some formulas? Why can't all formulas use relative references?

## Skills Review

### Exercise 4-26

**Build addition and subtraction formulas. Create multiplication and division formulas.**

#### REVIEW


Exit Protected View by enabling editing for workbooks opened from an Internet location.

AllAround Vision Care maintains its own check register so that it can verify all its bank records. The data for the Dallas office have been started, and you now need to add dates, payee information, and the formulas. The main formula subtracts the credit amounts (checks) and adds the deposit amounts; it uses relative references. In another worksheet, you are to calculate daily pay for several part-time employees using a simple multiplication formula. On the third worksheet in this workbook, the employees daily pay is shown, and you are to calculate their hourly rates.

- Open **Excel\_SR4-26** and save the workbook as *[your initials]4-26*.
- In cell A4, key today's date in mm/dd/yy format. Adjust the column width if necessary.
- Build addition and subtraction formulas by following these steps:
  - Click cell A5. Key **=** to start a formula.
  - Click cell A4 and key **+** for addition. Key **1** to add one day to the date in cell A4. Press **Enter**.
  - Copy the formula in cell A5 to cells A6:A15.
  - Click cell F5. Key **=**. Click cell F4 and key **-** for subtraction.


**TIP**

The formula subtracts amounts in column D and adds amounts in column E.

- e. Click cell D5 and key **+** for addition.
  - f. Click cell E5. Press **[Enter]**.
  - g. Click cell F5, and click the Error Checking Options button . Choose **Ignore Error**.
  - h. Copy the formula in cell F5 to cells F6:F15. The results are all the same at this point.
  - i. Select the copied range of cells and ignore the error.
4. Key the following information, starting in cell B6. Use AutoComplete when appropriate. The values columns are formatted so you only need key the value.

**Figure 4-22**

	A	B	C	D	E
6	mm/dd/yy	1002	Artec Optical	1231	
7	mm/dd/yy				4500
8	mm/dd/yy	1003	US Post Office	127.5	
9	mm/dd/yy	1004	Mulcahy and Pauritsch	400	
10	mm/dd/yy	1005	Modern Frames, Inc.	1575	
11	mm/dd/yy				2375
12	mm/dd/yy	1006	Artec Optical	850	
13	mm/dd/yy	1007	US Post Office	75	
14	mm/dd/yy	1008	Federal Quick Ship	55	
15	mm/dd/yy				1225

5. In cell C15, key your first and last name.
6. Build a multiplication formula by following these steps:
  - a. Click the **DailyBase** worksheet tab.
  - b. Click cell A5, and click the Error Checking Options button . Note that the formula refers to cell A4 which is empty.
  - c. Click cell A4, and key today's date in mm/dd/yy format. All dates are recalculated.
  - d. Click cell F5 and key **=**. Click cell D5 for hours worked.
  - e. Key **\***. Click cell E5 and press **[Enter]**.
  - f. Copy the formula in cell F5 to cells F6:F15.
  - g. Select cells C5:C15. Replace all occurrences of "Laron, Elizabeth" with your **[Last Name, First Name]**.
7. Build a division formula by following these steps:
  - a. Click the **NewRates** worksheet tab.

**NOTE**


There is some rounding in the division formula results; Excel rounds to the closest penny for currency.

- b. Click cell E5 and key =. Click cell F5. The daily pay is divided by the number of hours worked.
- c. Key /. Click cell D5. Press **Enter**.
- d. Copy the formula in cell E5 to row 15.
- e. Key your name in cell C4, and increase the indent one time for data in column C.

8. Prepare and submit your work. Save and close the workbook.

**Exercise 4-27****Build subtraction formulas. Set highlight cells rules.**

Employees at AllAround Vision Care earn paid vacation days based on their length of service, their evaluations, and their participation in WorldWide Campaign efforts. The company does allow workers to take unearned days, though, and “pays” them back in the future. You need to calculate the current status of this worksheet using a subtraction formula. Sick days are also earned and expended, and employees can contribute some of their days to a sick bank that any employee can use in an emergency. These data need to be calculated too. On both sheets, you are to highlight those cells that indicate days owed to the company.


1. Open **Excel\_SR4-27**. Save the workbook as *[your initials]4-27*.
2. Build subtraction formulas by following these steps:
  - a. On the **VacDays** worksheet tab, click cell F4.
  - b. Key = and click cell D4. Key - and click cell E4. Press **Enter**.
  - c. Copy the formula in cell F4 to cells F5:F18.
  - d. On the **SickDays** worksheet tab, click cell G4.
  - e. Key = and click cell D4. Key - and click cell E4. Key - again and click cell F4. Press **Enter**.
  - f. Copy the formula in cell G4 to cells G5:G18.
3. Build highlight cells rules by following these steps:
  - a. On the **VacDays** worksheet tab, select cells F4:F18.
  - b. Click the Conditional Formatting button . Hover at **Highlight Cells Rules**, and choose **Less Than**.
  - c. Key 0. Click the arrow with the format choices. Choose **Custom Format**.
  - d. Click the **Fill** tab. In the **Background Color** group, click the third icon in the first column below the separator line with the theme colors. Click **OK** to close the Format Cells dialog box. Click **OK** to close the Less Than dialog box.

**REVIEW**

Use the Fill handle or regular Copy and Paste commands to copy the formulas.

**NOTE**

Not all operators are listed in the Highlight Cells Rules gallery. The < operator (less than) is different from the <= operator (less than or equal to).

- e. Key your first and last name in cells C4 and B4, replacing the existing data. Press **Ctrl**+**Home**.
  - f. On the **SickDays** worksheet tab, select cells G4:G18.
  - g. Click the Conditional Formatting button . Hover at **Highlight Cells Rules** and choose **More Rules**.
  - h. In the middle box in the **Edit the Rule Description** group, click the arrow. Choose **Less than or equal to**. Click in the third box, and key **0**.
  - i. Click **Format**. Click the **Fill** tab. In the **Background Color** group, click the third icon in the seventh column. Click **OK** to close the Format Cells dialog box. Click **OK** to close the New Formatting Rule dialog box.
  - j. Key your first and last name in cells C4 and B4. Press **Ctrl**+**Home**.
4. Prepare and submit your work. Save and close the workbook.

## Exercise 4-28

**Use order of precedence. Set relative, absolute, and mixed references.**

To help raise funds for the WorldWide Campaign, each office of AllAround Vision Care sells candy bars during the various time frames. They buy the candy bars from the campaign at a set cost and can set a selling price. The difference is the amount donated to the campaign. The amount donated is included on one worksheet, and the candy bar cost is on a separate sheet. The way the data are set up requires using various types of cell references in your formulas.

1. Open **Excel\_SR4-28**. Save it as *[your initials]4-28*.
2. Set order of precedence with mixed and relative references by following these steps:
  - a. Click cell E16, and key **=** to start.
  - b. Click cell C7, and press **F4** three times to show “**\$C7**.” When copied, this cell address will always show column C but will update the row number.
  - c. Key **\*** to multiply by this amount.
  - d. Key **(** to define order of precedence.
  - e. Click cell D7 and key **+**. Click cell E7 and key **+**. Click cell F7 and key **+**.
  - f. Click cell G7 and key **)** to set the order of precedence. The cell addresses for this addition are relative so that, when copied, it will adjust to the new row.
  - g. Press **Ctrl**+**Enter**. Copy this formula to cells E17:E20.
3. Apply Comma style to cells D7:G11 and decrease the decimal two times. Apply currency format to cells E16:E20 and decrease the decimal two times.
4. Use SUM in cell E21 with the currency format and no decimals.
5. Select cells D15:E20. Point at the top edge of the selected range, and hold down **Ctrl**. Drag a copy of the cell range to cells D24:E29. An error message in the cells shows “**#VALUE!**”


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## TIP

Scroll the worksheet down a bit so that it is easier to drag and drop the cell range to row 24.



6. Click cell E25 and click the Error Checking Options button . The error in value is due to the formula multiplying by cells that either have a label or nothing in them.
7. Select cells E25:E29 and press **Delete** on the keyboard. In cell D24, key **Total Cost**.
8. Set order of precedence with a 3-D relative reference by following these steps:
  - a. Click cell E25 and key **=** to start.
  - b. Key **(** to define order of precedence.
  - c. Click cell D7 and key **+**. Click cell E7 and key **+**. Click cell F7 and key **+**.
  - d. Click cell G7 and key **)** to set the order of precedence.
  - e. Key **\*** to multiply.
  - f. Click the **Costs** worksheet tab. Click cell C3 and press **Enter**.
  - g. Format cell E25 as currency with no decimals, and then copy the formula to cells E26:E29.
  - h. Add a footer with your first and last name in the right section and the file name in the center.
9. Use an absolute reference by following these steps:
  - a. Click the **DarkChocolate** worksheet tab. Click cell H4.
  - b. Key **=** to start. Click the **CandySales** worksheet tab and click cell D8. Press **Enter**.
  - c. Click cell H5. Key **=** and click the **CandySales** tab. Click cell E8 and press **Enter**.
  - d. Use a 3-D relative reference to show the dark chocolate sales for Dallas and Seattle.
  - e. Click cell I4. Key **=** and click cell H4.
  - f. Key **\*** to multiply and click cell C3. Press **F4** to make it absolute showing "\$C\$3." Press **Enter**.
  - g. Copy the formula to cells I5:I7. Format these cells as currency with no decimals.
  - h. Format cells H4:H7 as Comma style with no decimals.
  - i. Add a footer with your first and last name in the right section and the file name in the center.
10. Make sure all data are visible. Prepare and submit your work. Save and close the workbook.

## Exercise 4-29

**Copy and group worksheets. Work with the Page Layout command tab.**

Chicago patient data are maintained in a workbook with some of the data separated by insurance company. AllAround Vision Care wants to continue this practice and place patient data on a worksheet based on the insurance

provider. Since some of the data are mixed, you can copy that sheet and then simply delete the appropriate rows. Since the sheets all follow the same basic layout, you can group them to complete the formatting.

1. Open **Excel\_SR4-29** and save it as *[your initials]4-29*.
2. Copy a worksheet by following these steps:
  - a. Right-click the **All** worksheet tab and choose **Move or Copy**.
  - b. In the **Before sheet** list, choose **(move to end)**. Click to select **Create a copy**. Click **OK**.
  - c. Rename the copied sheet **WhiteCross**. Rename the **All** sheet **GeneralHealth**.
  - d. Arrange the worksheets in alphabetic order (A-Z) by worksheet tab name.
3. Click the **GeneralHealth** worksheet tab. Select rows 4:5 and right-click either row heading. Choose **Delete**. Continue selecting and deleting rows so that only those patients who have General Health insurance are displayed on this sheet.
4. Click the **WhiteCross** worksheet tab. Select and delete rows so that only White Cross patients are listed on this sheet.
5. Group worksheets by following these steps:
  - a. Click the **GeneralHealth** worksheet tab.
  - b. Hold down the **[Shift]** key and click the **WhiteCross** worksheet tab (or the rightmost worksheet in your workbook).
  - c. Select cells A3:H3 and apply a single bottom border.
  - d. Select cells A4:H15, and design borders that use dotted horizontal lines and solid vertical lines. This formats rows for new patients.
  - e. Select cells A4:H15 and increase the indent one time.
6. Work with the Page Layout command tab by following these steps:
  - a. While the sheets are grouped, click the **Page Layout** command tab.
  - b. In the **Page Setup** group, click the Page Orientation button . Choose **Landscape**.
  - c. In the **Page Setup** group, click the Dialog Box Launcher. Click the **Header/Footer** tab.
  - d. Click **Custom Footer**. Replace the text in the left section with your first and last name. Click **OK** to close the Footer dialog box. Click **Print Preview** in the **Page Setup** dialog box.
  - e. Press the Next Page arrow  to view each sheet. Close Backstage view.
  - f. Press **[Ctrl]+[Home]**.
  - g. Right-click any worksheet tab and choose **Ungroup Sheets**.
7. Prepare and submit your work. Save and close the workbook.

**NOTE**

Click the Undo button  if you make an error in deleting rows.

## Lesson Applications

### Exercise 4-30

#### Create a highlight cells rule.

AllAround Vision Care ophthalmologists and optometrists perform a wide variety of procedures for patients. Several of those are tracked in a worksheet to help determine when additional equipment might be needed. The worksheet needs to be formatted to highlight those cities and procedures that are reaching higher numbers.

1. Open **Excel\_LA4-30** and save it as *[your initials]4-30*.
2. Switch to the Flow document theme. Apply the Title cell style to cells A1:A3, but change the font color to black. Then center these labels across the data using either Merge and Center or Center Across Selection.
3. Select the cells with values, and build a highlight cells rule to show values between 300 and 400 with a light-to-medium gray fill.
4. Increase the height of rows 4:11 to better show the data. Then build borders that contribute to easier viewing of the data. Make other format choices as needed.
5. On the Page Layout tab in the Scale to Fit group, set the worksheet so that it prints on one page if necessary. Turn off printing of gridlines and headings.
6. Add a footer that includes your name and the file name.
7. Prepare and submit your work. Save and close the workbook.



#### NOTE

Center Across Selection can be applied to several rows at once. Merge and Center requires that each row be done separately.

### Exercise 4-31

#### Use an absolute reference. Copy a worksheet and work with the Page Layout command tab.

Employee insurance claims are kept separate from patient insurance information. One worksheet has tracked the number of claims per office for a recent time period and in certain categories. Since there is a processing cost for each claim, AllAround Vision Care can calculate total costs of processing its in-house claims.

1. Open **Excel\_LA4-31** and save it as *[your initials]4-31*.
2. Insert two columns after column E. In cell F6, key **Total Claims**. In cell G6, key **Total Cost**.



**TIP**

Check alignments and formats carefully. Depending on how a format is initially applied, there can be subtle differences.

**NOTE**


Add a header and footer before copying a worksheet so that they are included on the copied sheet.

3. Sum the claims for each city in column F. Check errors and ignore them if appropriate.
4. In cell G7, build a formula with an absolute reference to multiply the total number of claims by the cost per claim. Copy the formula.
5. Change the page orientation to landscape. Use Backstage view to determine what additional work is needed for consistent borders. Center the worksheet horizontally on the page.
6. Add a footer to the sheet that includes your name and the file name. Then make a copy of the worksheet and name the copy **HalfYr (Formulas)**.
7. Display formulas on the **HalfYr (Formulas)** sheet. Adjust the column widths of all columns except column B so that the worksheet will fit on a single page. Column B includes the main labels, and reducing its width will hide the labels.
8. Prepare and save your work. Save and close the workbook.

## Exercise 4-32

**Use order of precedence. Work with the Page Layout command tab.**

There is an order form provided by the WorldWide Campaign that lists basic office supplies available at reduced prices. The formula is wrong and must be corrected. After that is completed, you will create this form as a “four-up” sheet so that when it is reproduced and cut, four forms are made from one sheet of paper.

1. Open **Excel\_LA4-32** and save it as **[your initials]4-32**.
2. Display the formulas. The formula should multiply each quantity by its related price. Review it and edit it to fix errors. It is not necessary that there be values in the quantity column to build this formula.
3. Hide formulas, and build another formula in cell C14 that calculates the rebate amount. In cell C15, create a formula to subtract the rebate from the subtotal. All results should be formatted with accounting number style.
4. Center the two main labels across columns A:C. Apply borders to aid in readability of this order form.
5. Save your workbook with the same file name. Then key sample test quantities to verify that your formulas are calculating properly. Keep in mind that sometimes the error is in the formatting. When you are confident that your formulas are correct, delete the sample quantities.
6. Set the page orientation to landscape.
7. Copy and paste cells A1:C15 to start in cell E1, and choose  **Keep Source Column Widths**, from the paste options.

**NOTE**

You can use any combination of pointing, clicking, or keying to complete a formula.

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8. Use Backstage view or Page Layout view to determine how to set column widths so that the data fit on a single page. You can reduce the width of column D too.
9. Copy and paste all the data to row 17 so that there are four copies of the order form on your worksheet. Check for discrepancies in row height, and make adjustments.
10. Center the worksheet horizontally on the page. Then set the **Height to 1 page** in the **Scale to Fit** group.
11. Add a header that includes your name and the file name.
12. Prepare and submit your work. Save and close the workbook.

### Exercise 4-33 ♦ Challenge Yourself

**Use mixed references. Work with the Page Layout command tab.**

In efforts to monitor its use of natural resources, the company has built a table that helps each office calculate its water consumption. It is a matrix-style worksheet and requires a mixed reference multiplication formula. This worksheet is for in-house use only, so there is no need for main identifying labels. It does need to be formatted so that it is easily read.

1. Open **Excel\_LA4-33**. Save it as **[your initials]4-33**.
2. Create a mixed reference multiplication formula in cell C4 that multiplies gallons per hour (row 2) by number of hours (column B). One formula can be copied across row 4 to column N and then down to row 13 (or down to row 13 and then across to column N). Troubleshoot the formula until it works properly.
3. Set landscape orientation. Apply borders, fill, and other formatting to make the numbers easy to follow. Fit the worksheet to one page.
4. Add a footer that identifies the workbook and includes your name.
5. Prepare and submit your work. Save and close the workbook.

## On Your Own

**In these exercises you work on your own, as you would in a real-life work environment. Use the skills you've learned to accomplish the task—and be creative.**

### Exercise 4-34

Create a new workbook and save it as **[your initials]4-34**. Starting in cell A3, create a day-of-the-week column series that starts with "Monday."

In cell B2, key **Minutes**. In a cell below “Sunday,” key a cost that represents the per minute charge for your cell or home phone. Key a number of minutes for each day, and then compute a daily cost in column C. Add other labels as needed. Apply formatting to make the worksheet easy to read. Add a header or footer to identify your work, and then make a copy of the sheet to show formulas. Save the workbook as *[your initials]4-34*. Prepare and submit your work. Save and close the workbook.

### Exercise 4-35

Create a new workbook and save it as *[your initials]4-35*. In cell A1, key **Tip Calculator**. In cell B2, key **10%**; in cell C2, **15%**; in cell D2, **18%**; and in cell E2, **20%**. Starting in cell A3, create a column series with a \$5 interval that goes from \$10 to \$100. Using mixed references, create a formula in cell B3 to determine a restaurant worker’s tip based on the amount and the percentage. Show two decimal places for the results. Copy this formula. Apply cell styles, formatting, borders, and fill for an attractive appearance. Add an identifying header or footer, and then prepare a formulas worksheet. Choose a page orientation, and fit both sheets to the page. Prepare and submit your work. Save and close the workbook.

### Exercise 4-36

Develop a worksheet that lists 10 student names in column A, starting in row 4. In columns B:E, key labels in row 3 to identify a quiz, an exam, or an assignment. Key scores for each item for each student using a grading scale based on 100% being the top score. In column F, calculate an average for each student. For the averages column, set a top-bottom conditional formatting rule that shows the top three scores with a light gray fill. Add an identifying header or footer. Save your workbook as *[your initials]4-36*. Prepare and submit your work. Save and close the workbook.