

**EXCEL 2021 & 365**

# Date Functions and Conditional Formatting

In this chapter, you will use a variety of methods to work with an important type of data in Excel: date and time information. Dates provide useful information for all kinds of data, such as when customer invoices are due and when payments were made, or recording company expenses, schedules, and reports. You will also explore creating and customizing conditional formatting rules to gain valuable insight into the data in your worksheet.

## LEARNING OBJECTIVES

- Identify date serial numbers
- Apply custom date formatting
- Enter times
- Create functions using dates
- Perform date and time calculations
- Create customized conditional formatting rules
- Edit rules using the Conditional Formatting Rules Manager

## CHAPTER TIMING

- Concepts & Practice: 01:20:00
- Self-Assessment: 00:15:00
- Total: 01:35:00

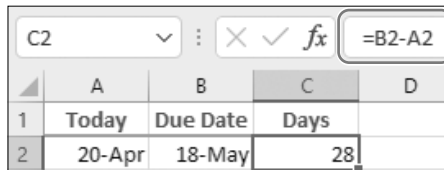
## PROJECT: UPDATING COMPANY DOCUMENTS

Airspace Travel, which provides travel packages to tropical destinations, prides itself on providing top-notch customer service. As part of its service plan, the company carefully tracks its customers' travel dates and flight times, as well as the frequency of their trips. You have been lending your Excel expertise to the company, and now Airspace has given you the task of reviewing and updating their travel information.

## Date Serial Numbers

In Excel, dates are stored as sequential serial numbers. To understand dates in Excel, you must also know that Excel dates start with January 1, 1900. The serial number for January 1, 1900, is 1, and the serial numbers increase by one for each day after that date. For example, the serial number 501 represents May 15, 1901, which is exactly 500 days after January 1, 1900.

Using serial numbers for dates is helpful because it means that they can be used in calculations and functions. For example, you can use a formula to find the days until a payment is due by starting with the due date and subtracting today's date.



The image shows the Excel formula bar with the formula `=B2-A2` entered in cell C2. Below the formula bar, a worksheet is visible with columns A, B, C, and D. Row 1 contains the headers 'Today', 'Due Date', and 'Days'. Row 2 contains the values '20-Apr', '18-May', and '28'.

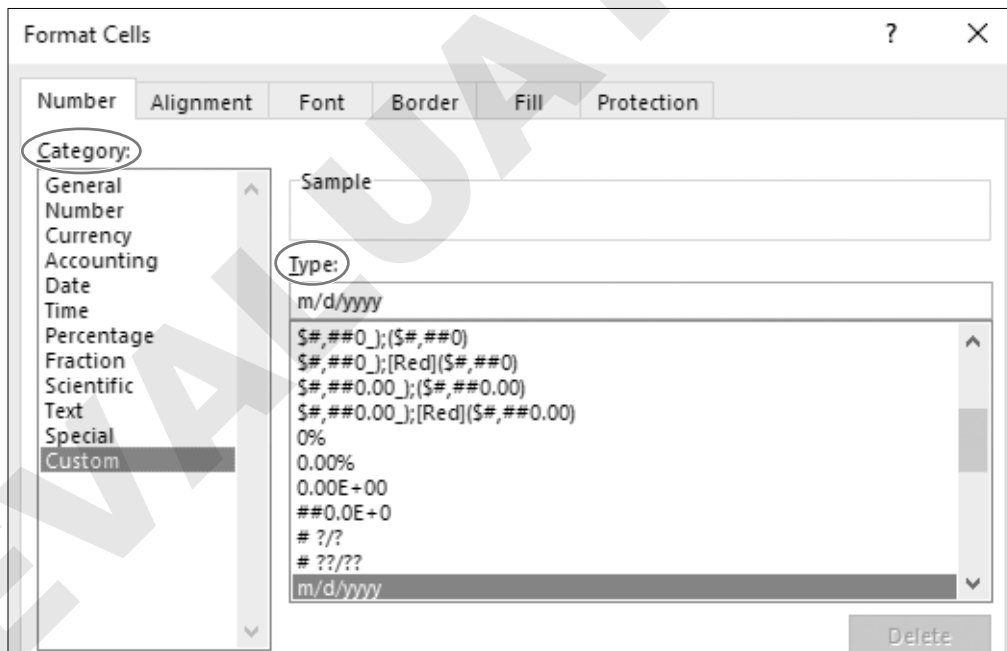
	A	B	C	D
1	Today	Due Date	Days	
2	20-Apr	18-May	28	

The formula in cell C2, `=B2-A2`, subtracts today's date in cell A2 from the due date in cell B2.

## Applying Custom Date Formatting

There are many ways to enter a date into a cell, and depending on how you do so, Excel will apply one of the default date formats—usually either `4/17/2026` or `17-Apr`. After entering a date, you have the option of adjusting the date formatting using the Number Format drop-down menu or applying custom date formatting. The Number Format menu gives you two options, Short Date and Long Date; for example, `4/17/2026` and `Friday, April 17, 2026`, respectively.

Additional date formatting options are available from the Format Cells dialog box, either in the Date or the Custom category. Both categories have many options to choose from under Type.



In Custom format, *d* represents the day, *m* represents the month, and *y* represents the year. You can also create your own date formats by using the codes *d*, *m*, and *y* in different combinations, similar to creating other custom number formats.

CUSTOM DATE FORMATTING			
Category	Format Type	Description	Display for April 17, 2026
Date	3/14	Month/Day	4/17
	3/14/12	Month/Day/Year	4/17/26
	March-12	Month-Year	April-26
	March 14, 2012	Month Day, Year	April 17, 2026
Custom	d-mmm	Day-Month	17-Apr
	d-mmmm	Day-Month	17-April
	d-mmm-yy	Day-Month-Year	17-Apr-26
	dddd mmmm "the" d	Day of the Week Month "the" Day	Friday April the 17

 **View the video “Custom Date Formatting.”**

## DEVELOP YOUR SKILLS: E7-D1

In this exercise, you will enter dates and then use those dates in a simple calculation. You will also apply different formatting to the dates.

1. Start Excel; open a new, blank workbook and save it to your **Excel Chapter 7** folder as: **E7-D1-DaysOld**

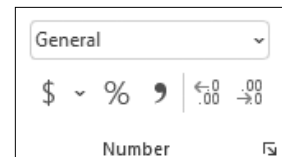
2. In **cell A1**, enter today's date in the format *mm/dd* and tap **Enter**.

*When only the month and day are entered, Excel automatically assigns the current year to the date (even though the year does not display in the worksheet, it is stored in the Formula Bar).*

3. In **cell A2**, enter your birth date, including the year, and tap **Enter**.

4. In **cell A3**, enter the formula: **=A1 - A2**

*To find the difference between two dates, always subtract the lower date from the higher date (remember each day counts up by one), and the result is the number of days between the two. The result in cell A3 shows how old you are, calculated in the number of days! Notice that the number format in cell A3 is General.*



5. Select the two dates in the **range A1:A2** and choose **Home→Number→Number Format menu button ▼→General**.

*The format for the two dates is converted to General, which means the serial number for those dates is now displayed.*

6. With the same range selected, choose **Home→Number→Number Format menu button ▼→Long Date**.

*The Long Date format displays the day of the week, so you can see the day of the week on which you were born (in case you don't remember!).*

7. In **cell B3**, type **days old** and tap **Enter**.

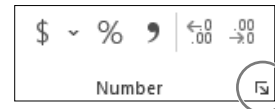
8. Save the file and close it.

*Now you will apply various formatting to the dates in the Airspace customer invoices file.*

9. Open **E7-D1-Invoices** from your **Excel Chapter 7** folder and save it as: **E7-D1-Clients**

10. Select the invoice dates in the **range G4:G13**.

11. Open the Format Cells dialog box by clicking the **Number Format** dialog box launcher.



*Because you opened the dialog box from the Number group on the Ribbon, the active tab is Number.*

12. If necessary, choose **Custom** from the Category list.

13. Clear the existing text in the Type box and then enter the code **mmm-d** and click **OK**.

*The date display is now reversed, showing the short-form text for the month and then the day.*

Invoice Date
Sep-8
Sep-7
Sep-1

14. Select the travel dates in the **range J4:J13**.

15. Open the Format Cells dialog box from the Number group again and ensure the **Custom** category is selected.

*The day of the week is important to know for travel information, so you will add the day of the week using a custom date format.*

16. In the Type box, enter the code **ddd mmm-d** and click **OK**.

*The day of the week now precedes the month for the dates in the Travel Date column.*

Travel Date
Mon Oct-12
Wed Sep-30
Sun Oct-4

17. Save the workbook.

## Entering Time Information

Much like you do with dates, you can enter times exactly as you want them to appear in the workbook. For example, if you type **6:00** into a cell, Excel will recognize this as a time entry and display it in the cell as **6:00**. Just like dates and numbers, times are right-aligned by default.

6:00
20-Jun
500

Also similar to dates, each time has a serial number attached to it. Because each day is 1, each hour is 1/24 (or 0.041667 if written as a decimal). Therefore, if you enter **6:00**, Excel displays the time as **6:00** but stores the information as 0.25 (six hours is one-quarter of the day). Combining the date and time would mean that 12:00 noon on July 1, 2010, is stored with the serial number 40360.5; the date serial number is 40360 and the time is 0.5, halfway through the day.

Most of the time, you won't have to worry about the serial number. As long as the time is entered correctly, Excel will apply the correct custom number formatting.

You can also add an AM/PM designation, if you prefer, rather than using a 24-hour clock, but you must enter a space between the time and either AM/PM. You can enter **6:00 AM** for the morning or **6:00 PM** for the evening (note the space before *AM* and *PM*). If no designation is entered, Excel assumes you are using the 24-hour system, so 6:00 is stored as 6:00 AM. You can also use number formatting to customize the way the time displays on the worksheet.

TIME ENTRIES		
Entry	Display	Time Stored As
6:00	6:00	6:00:00 AM or 0.25
9:00 AM	9:00 AM	9:00:00 AM or 0.375
12:00	12:00	12:00:00 PM or 0.5
13:30	13:30	1:30:00 PM or 0.5625
6:00 PM	6:00 PM	6:00:00 PM or 0.75

## DEVELOP YOUR SKILLS: E7-D2

In this exercise, you will enter the flight times for Airspace's clients into the worksheet.

1. Save your file as: **E7-D2-Clients**

The first time in cell M4 displays the AM designation, while the rest of the times are displayed in the 24-hour system (for example, 20:00).

2. Select the flight times in the **range M5:M10** and choose **Home→Number→Number Format menu button ▼→General**.

The serial numbers for the flight times are displayed.

Now you will adjust the number formatting to display the correct time format.

3. With the flight times in the range M5:M10 still selected, click the **Number Format** launcher in the Number group on the Ribbon.
4. Choose **Time** from the Category list, and then choose the third option, which will display hours:minutes AM/PM, from the Type list and click **OK**.
5. Enter the remaining clients' flight times into the **range M11:M13** as shown.

Be sure to type hour:minutes AM/PM and include the space to display the correct designation for AM or PM.

	A	B	M
11	Karynn	Alida	5:30 PM
12	David	Monton	7:20 AM
13	Amanda	Campbell	9:00 AM

Sample
8:00 PM
Type:
*1:30:55 PM
13:30
1:30 PM
13:30:55
1:30:55 PM
30:55.2
37:30:55

6. Save the file.

## Using Date Functions

Excel has many date functions available in the Function Library. Dates are commonly found in Excel worksheets because they provide useful information about when an event or a transaction took place. Date information becomes even more useful when you can use it in formulas and functions. For example, you can use date functions to insert the current date or to extract information from a date, such as the month or year.

You enter date functions just like you do other functions, such as SUM. For example, you can use the TODAY function to enter today's date like this: =TODAY(). For this function, no arguments are entered inside the parentheses.

DATE FUNCTIONS		
Function	Description	Example
TODAY()	Displays the current date based on today's serial number; the date automatically updates when the worksheet is recalculated or reopened; no arguments are included in the parentheses	Formula: =TODAY() Result: 2/21/2026
NOW()	Like TODAY but also displays the time (based on the computer's clock); no arguments are included in the parentheses	Formula: =NOW() Result: 2/21/2026 11:09
DATE (year,month,day)	Returns a specific date based on the arguments entered	Formula: =DATE(2026,12,20) Result: 12/20/2026
YEAR(date)	Returns the year of the specified date as either a serial number or a cell reference to a cell containing a date	Cell B23: 12/20/2026 Formula: =YEAR(B23) Result: 2026
WEEKDAY()	Returns the number of the corresponding day for the date provided, entered either as a serial number or a cell reference, from 1 to 7; Sunday is 1	Formula: =WEEKDAY(B23) Result: 1
WORKDAY()	Used for adding workdays (Monday to Friday) to a start date, such as adding 10 business days to the date of an invoice; holidays can be skipped if listed somewhere in the workbook	Cell G1: 12/25/2026 Formula: =WORKDAY(B23,5,G1) Result: 12/28/2026

## DEVELOP YOUR SKILLS: E7-D3

In this exercise, you will use date functions to enter date-related information into your worksheets.

1. Save your file as: **E7-D3-Clients**
2. Insert a new row above the column headings in **row 3** of the worksheet.
3. In **cell D3**, type **Month:** and tap **[Tab]**.
4. In **cell E3**, enter the formula **=G5** and complete the entry.

*You wish to display the month of the listed invoices, so you will edit the number format to display only the month of the first invoice listed.*

5. With cell E3 selected, open the Format Cells dialog box from the Number group on the Ribbon.
6. Ensure the Custom category is chosen; in the Type box, edit the code to display **mmmm** only and click **OK**.

*The code mmmm displays the full month name, whereas the code mmm displays the three-letter abbreviation, and no day or year information. Cell E3 now displays September.*

7. Merge and center the **range E3:F3**.
8. In **cell H3**, enter **Year:** and tap **[Tab]**.

9. In **cell I3**, enter the formula **=YEAR (G5)** and complete the entry.

*The formula argument is simply looking for a serial number, which is provided by entering a cell reference to a cell that contains a date. The result of the formula is the year from the date of the first listed invoice in cell G5, which is 2026.*

10. Merge and center the **range I3:J3**.
11. Go to the **Client History** worksheet and insert a new row above the column headings in **row 3**.
12. In **cell A3**, enter **As Of :** and then merge and center the **range A3:B3**.
13. In **cell C3**, enter the formula **=TODAY ()** and then merge and center the **range C3:F3**.
14. Apply the **Long Date** number format to **cell C3**.
15. Save the file.

## Calculations Using Date and Time

When you understand the basic principles of dates and time in Excel, there are many valuable ways to use this information. You can perform mathematical operations such as addition and subtraction to find the difference between two dates or add a number of days to a particular date. Likewise, you can take two times and find the time difference or add and subtract hours and even minutes.

You can combine these mathematical operations with the date functions for even more applications. For example, you can use the TODAY function to insert today's date in one cell and enter a future date such as next Christmas in another cell, and then use a formula to subtract today from Christmas to determine the number of days remaining until the holiday. Any time you open the file, the TODAY function updates to the current date, so the formula calculation updates the number of days until Christmas. Of course, in business, there are much more practical applications.

### DEVELOP YOUR SKILLS: E7-D4

*In this exercise, you will use date functions to enter date-related information in your worksheets.*

1. Save your file as: **E7 -D4 -Clients**

2. Go to the **Sept** worksheet.

*Airspace Travel allows customers to take up to three months after their travel date to pay for their trip, so you will enter a formula to calculate the due date.*

3. In **cell L5** of the Balance Due Date column, enter this formula: **=EDATE (J5 , 3)**

*The EDATE function takes two arguments: the start date, which is the travel date in cell J5, and the number of months to add to the date, which is three. The result of the formula for the first client is January 12, three months after October 12.*

4. Copy the formula down the column for the remaining clients.

*You instruct your clients to arrive at the airport three hours before their flight time, so now you will enter a formula to calculate their planned arrival times.*

5. In **cell N5**, enter the formula: **=M5 - (1/24\*3)**

*This formula takes the time saved in cell M5 and subtracts three hours (one hour is 1/24). The result of the formula for the first client is 8:00 AM.*

6. Copy the formula down the column for all clients.

7. Go to the **Client History** sheet and insert a column to the left of **column F**.
  8. In **cell F4**, enter the heading: **Days Since Travelled**
  9. In **cell F5**, enter the formula: **= \$C\$3 - E5**

*Because cell C3 contains the TODAY function and cell E5 contains the last travel date, the formula result will update to show the new number of days since that customer has travelled each time you open the file. However, you must first change the number format so it does not show a date.*
  10. Apply the **General** number format to **cell F5**.

*Now you can see how many days since the first customer, Eric, took his last trip. This information could be used to reach out to customers who haven't travelled in a long time. Of course, this number will depend on the day on which you complete this exercise.*
  11. Copy the formula down the column for the remaining clients.

*Because the formula uses an absolute reference to cell C3, that cell reference stays the same for each customer.*
  12. Insert a column to the left of **column E**.
  13. In **cell E4**, enter the heading: **Years of Loyalty**

*Now you want to enter a formula to find the number of years since each customer first became a client. The YEARFRAC function will find the difference between the dates and will return a whole number for complete years and then convert excess days into a fraction of a year. For example, 1 year and six months would display as 1.5.*
  14. In **cell E5**, insert the formula: **=YEARFRAC(D5, \$C\$3)**

*Again, you must convert the number format for the result to make sense.*
  15. Choose **Home**→**Number**→**Comma Style** to apply that number format to **cell E5**.
  16. Choose **Home**→**Number**→**Decrease Decimal** to reduce the number of decimal places showing to one.
  17. Copy the formula in **cell E5** down the rest of the column.

*The results of the formula will again depend on the day the exercise is completed and will update each day the file is opened.*
  18. Save the file.
- 

## Conditional Formatting Using Graphics and Custom Rules

Conditional formatting applies formatting to cells that meet your desired criteria. For example, there are preset conditional formatting options for the top or bottom numbers in the selected range, or cells that are greater than, less than, or equal to a number of your choice. You can create multiple rules for the same set of data, and the rules are applied in the order that you choose. Conditional formatting is always updated whenever the data changes.

If none of the options in the Conditional Formatting menu has your desired criteria, you can create a new conditional formatting rule. New rules can be created using the same basic principles as the preset rules; however, you can customize the specific way the rules are applied. You can also create conditional formatting rules based on the outcome of a formula.

## Conditional Formatting with Graphics

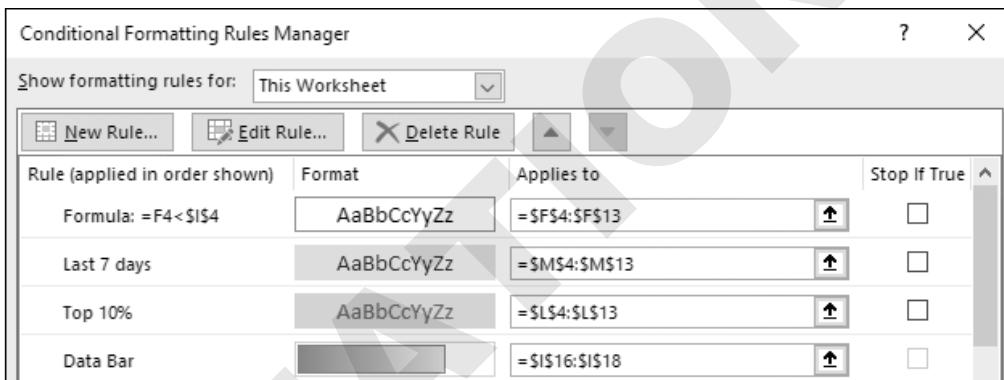
Another option for conditional formatting is to use data bars, color scales, and icon sets to visualize your data by breaking it into three equal parts: values that are above average, average, and below average in the selected range. There are many quick options to choose from in the Conditional Formatting menu, or you can create a custom rule. Another option is to modify the graphics so the three ranges are not three equal parts; for example, the top 10%, middle 80%, and bottom 10% instead.

Expenses	Actual	Budget		Difference
Bank Fees	7,200	7,300	✓	100
Insurance	18,230	17,000	✗	-1,230
Rent	25000	25000	✓	0

This data uses conditional formatting with data bars, a color scale, and an icon set to highlight trends and important information.

## The Conditional Formatting Rules Manager

Use the Conditional Formatting Rules Manager to create, edit, and delete rules or to rearrange the order in which they are applied. To see which rules have been created, you can choose to show the formatting rules for the current selection or the full worksheet.



In this example, you see the four rules on the current worksheet and the ranges to which the rules apply.

## Conditional Formatting Using Formulas

Creating a custom rule that uses a formula is another way of expanding the possibilities of conditional formatting. Instead of comparing the cells in the selected range to the other cells within that range, a rule allows any cell to be compared to a number or any other cell; if the formula is true, the formatting is applied.

To determine which employees are due for their annual wage review, you could highlight their names if one year has passed since their last review. The conditional formatting rule will compare their last

review date in column C plus 365 (one year) to see if it's less than today's date, entered in cell B13. The formula for the conditional formatting applied to the names in column A would be:  $=C2+365<\$B\$13$

	A	B	C
1	Employee Name	Department	Date of Last Review
2	Carol Gregory	Sales	1/22/21
3	Natasha Dyas	Admin.	1/2/21
4	James Norman	Management	1/15/21
5	Joshua Garcia	Sales	10/23/20
6	Sarah Mckinnon	Sales	1/5/21
7	Shannon Miller	Management	9/23/20
8	Katrina Kormylo	Admin.	1/8/21
9	Susan Colley	Sales	11/21/20
10	William Emerson	Admin.	10/19/20
11	Eugene Fink	Sales	11/12/20
12			
13	Today:	1/1/2022	

Select a Rule Type:

- Format all cells based on their values
- Format only cells that contain
- Format only top or bottom ranked values
- Format only values that are above or below average
- Format only unique or duplicate values
- Use a formula to determine which cells to format

Edit the Rule Description:

Format values where this formula is true:

$=C2+365<\$B\$13$

Preview: AaBbCcYyZz

OK Cancel

**TIP!** C2 is a relative reference and  $\$B\$13$  is an absolute reference. In conditional formatting, the rule is written for the first cell in the range (cell A2 here) and automatically adjusts cell references for each row/column (A3:A11). Today's date is a constant, so an absolute cell reference is required.

Home→Styles→Conditional Formatting→New Rule

Home→Styles→Conditional Formatting→Manage Rules

## DEVELOP YOUR SKILLS: E7-D5

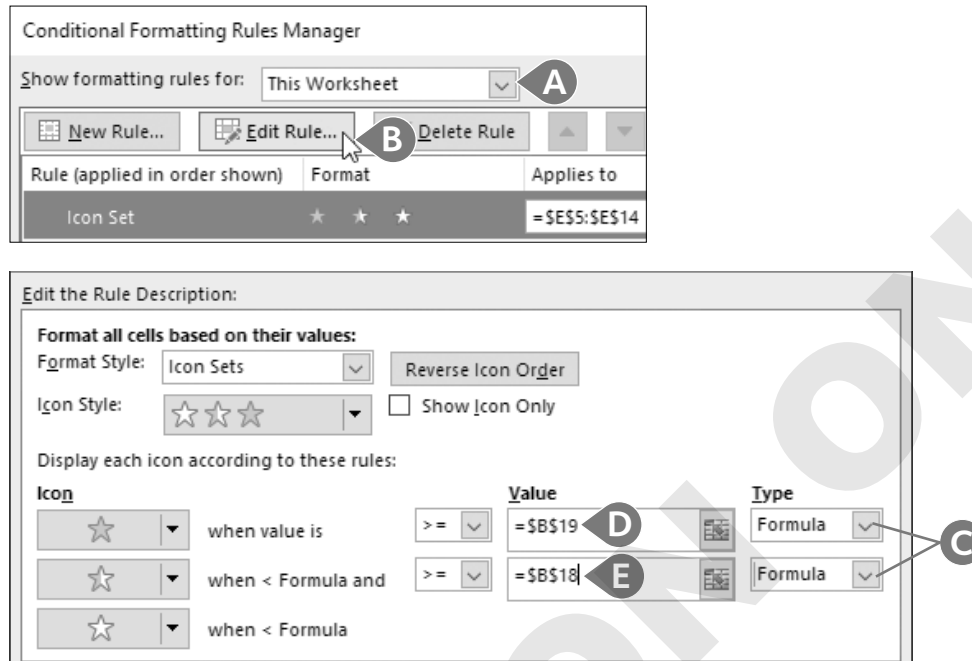
In this exercise, you will create and modify conditional formatting rules to highlight important information about your clients.

1. Save your file as: **E7-D5-Clients**
2. If necessary, select the data under *Years of Loyalty* in the **range E5:E14** (Client History sheet).
3. Choose **Home→Styles→Conditional Formatting→Icon Sets→3 Stars** (in the Ratings group).  
*The icons give an indication of the newest and oldest customers, but you have a loyalty program that you want to use instead.*
4. In **cell A17**, enter **Loyalty Program** and then merge and center the **range A17:B17** and apply a thick bottom border.
5. Enter the qualifications for Silver and Gold status in the **range A18:B19**:

	A	B
17	<b>Loyalty Program</b>	
18	Silver	3
19	Gold	5

## Edit an Existing Rule

6. Choose **Home**→**Styles**→**Conditional Formatting**→**Manage Rules**.
7. Follow these steps to edit the rule:



- A. Select **This Worksheet** to show all rules on the worksheet.
- B. Click **Edit Rule...**
- C. In the Edit Formatting Rule dialog box, change the type for each value to **Formula**.
- D. Click the box for the first value and then click **cell B19** on the worksheet.
- E. Click the box for the second value and then click **cell B18** on the worksheet.
8. Click **OK** to finish editing the rule; click **OK** again to close the Rules Manager.

*The full star icon is applied to Gold and Platinum clients, a half star is applied to Silver clients, and Bronze clients have an empty star; both Gold and Platinum are greater than or equal to five, and Bronze is less than three.*

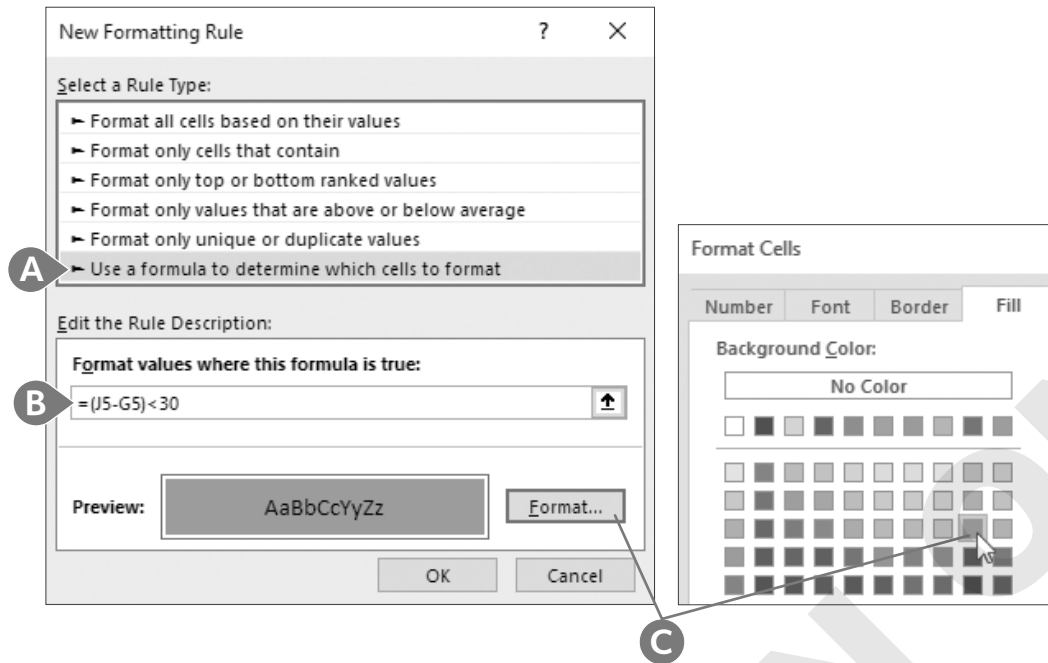
## Create a New Rule Using a Formula

9. Go to the **Sept** worksheet and select the invoice dates in the **range G5:G14**.

*You want to know which customers booked their trips less than 30 days in advance, so you will create a rule to highlight these customers.*

10. Choose **Home**→**Styles**→**Conditional Formatting**→**New Rule**.

## 11. Follow these steps to create the new rule:



- A.** Select **Use a formula to determine which cells to format**.
  - B.** Enter the formula **= (J5-G5) <30** to format values where this formula is true.
  - C.** Click **Format...**; in the Format Cells dialog box, click the **Fill** tab and choose any light blue color.
12. Click **OK** twice, once to close the Format Cells dialog box and again to create and apply the new rule.
- The rule takes the difference between the travel date in column J and the invoice date in column G, and then applies the blue fill if the difference is less than 30 days. The rule applies to four out of the ten customers.*

First Name	Last Name	Provider	Destination	# of Guests	Price Per Person	Invoice Date
Eric	Snow	Sunwind	Jamaica	2	\$ 899	Sep-8
Alison	Lobosco	Sunwind	Mexico	2	\$ 770	Sep-7
Lacy	Henrich	TrueBlue	Dominican Republic	4	\$ 1,200	Sep-1
Will	Johns	Eastjet	Cuba	3	\$ 950	Sep-9
Nicki	Hollinger	Sunwind	Mexico	1	\$ 875	Sep-8
Lennard	Williams	TrueBlue	Brazil	6	\$ 800	Sep-8
Kerri	Knechtel	TrueBlue	Columbia	4	\$ 560	Sep-5
Karynn	Alida	Sunwind	Bahamas	2	\$ 870	Sep-8
David	Monton	Eastjet	Dominican Republic	2	\$ 650	Sep-6
Amanda	Campbell	Sunwind	Jamaica	7	\$ 900	Sep-9

## 13. Save and close the file.

## Self-Assessment

Use the Self-Assessment quiz in the Student Resource Center to check your knowledge of the key concepts and skills introduced in this chapter.