



# Excel Functions Every Excel User Should Know, Pt. 3

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This article continues the *RCM Advisor* series covering basic Excel functions to make your spreadsheet projects easier and more accurate. The last issue discussed the **WEEKDAY** function that can make calculations based on the day of the week, such as call premiums. This issue will take our calendar discussion further by introducing the **NETWORKDAYS** function.

## Subtracting Dates

Normally, you can use a subtraction equation to figure out the number of days between two dates. Consider the example in Figure 1. The formula in cell O2 is =N2-M2. There are 10 days between Dec. 20 and Dec. 30. If you look at a calendar and physically count the days, you might count 11 days if

you include both the beginning date (Dec. 20) and the ending date (Dec. 30) in your count. To include both Dec. 20 and Dec. 30 in your count, you could always modify your formula by adding one to the result. For example, the formula in cell O3 in Figure 2 is =N2-M2+1. If you want to know how many work days are between those two dates, NETWORKDAYS is a great function to know.

## NETWORKDAYS

NETWORKDAYS is an Excel function that returns the number of whole work days between two dates you provide. The assumption NETWORKDAYS makes is that the work week is Monday through Friday. Weekend days are excluded. NETWORKDAYS has three parameters, or components of the function. The first two parameters, the start date and the end date, are required. The third parameter, holidays, is optional, but powerful.

A basic NETWORKDAYS days function might look like the example in Figure 3. The formula in cell O4 is =NETWORKDAYS(M2,N2). Though there are 10 calendar days between Dec. 20 and Dec. 30 (cell O2), only eight of those days are weekdays. Your employees will quickly protest that the Christmas holiday falls between those dates. That is where the third parameter of NETWORKDAYS comes into play.

## NETWORKDAYS with Holidays

To add company-observed holidays to the calculation, look at the calendar information in Figure 4. The company allows four holiday days, Dec. 22, Dec. 25, Dec. 29, and Jan. 1 during this part of the year. Note that the holiday dates are not on weekends. NETWORKDAYS already excludes weekends. We need to list those four holiday dates in an area of the spreadsheet for NETWORKDAYS to refer to.

Figure 5 is a sample abbreviated list of company holidays. Each holiday date is listed in a separate

FIGURE 1

	L	M	N	O	P
1					
2		12/20/2017	12/30/2017	10 Total Days	
3					
4					
5					
6					

FIGURE 2

	L	M	N	O	P
1					
2		12/20/2017	12/30/2017	10 Total Days	
3				11 Count Both Start and End Days	
4					
5					
6					

FIGURE 3

	L	M	N	O	P
1					
2		12/20/2017	12/30/2017	10 Total Days	
3				11 Count Both Start and End Days	
4				8 Network Days	
5					
6					

**FIGURE 4**

A	B	C	D
12/10/2017	Sunday		
12/11/2017	Monday		
12/12/2017	Tuesday		
12/13/2017	Wednesday		
12/14/2017	Thursday		
12/15/2017	Friday		
12/16/2017	Saturday		
12/17/2017	Sunday		
12/18/2017	Monday		
12/19/2017	Tuesday		
12/20/2017	Wednesday		
12/21/2017	Thursday		
12/22/2017	Friday		Holiday
12/23/2017	Saturday		
12/24/2017	Sunday	Christmas Eve	
12/25/2017	Monday	Christmas Day	Holiday
12/26/2017	Tuesday		
12/27/2017	Wednesday		
12/28/2017	Thursday		
12/29/2017	Friday		Holiday
12/30/2017	Saturday		
12/31/2017	Sunday	New Years Eve	
1/1/2018	Monday	New Years Day	Holiday
1/2/2018	Tuesday		
1/3/2018	Wednesday		

**FIGURE 5**

	H	I	J
1		Holidays	
2		12/22/2017	
3		12/25/2017	
4		12/31/2017	
5		1/1/2018	
6			
7			

**FIGURE 6**

	M	N	O	P
1				
2	12/20/2017	12/30/2017		10 Total Days
3				11 Count Both Start and End Days
4				8 Network Days
5				6 Network Days with Holidays
6				

cell. Figure 6 is our finished analysis. The formula in cell O5 is =NETWORKDAYS(M2,N2,\$I\$2:\$I\$5). Cell M2 is the start date, N2 is the end date, and cells I2 through I5 are the holidays the company wants to exclude from the calculation. Now that the formula is written and everything is working, staff can easily change cells M2 and N2 to calculate the number of company work days between any two dates.

Notice the dollar signs around cells I2 and I5 compared to the cell references M2 and N2 that do not contain dollar signs. The dollar signs convert the cell references to what Excel calls an absolute reference. Absolute references to

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FIGURE 7

Weekend number	Weekend days
1 or omitted	Saturday, Sunday
2	Sunday, Monday
3	Monday, Tuesday
4	Tuesday, Wednesday
5	Wednesday, Thursday
6	Thursday, Friday
7	Friday, Saturday
11	Sunday only
12	Monday only
13	Tuesday only
14	Wednesday only
15	Thursday only
16	Friday only
17	Saturday only
12	Monday only
13	Tuesday only
14	Wednesday only
15	Thursday only
16	Friday only
17	Saturday only

cells do not change, no matter where the Excel formula is copied. Cells M2 and N2 contain relative references, which will change when the Excel formula is copied. The formula in cell O5 is =NETWORKDAYS(M2,N2,\$I\$2:\$I\$5). If that formula was copied to cell O6, the new formula would be =NETWORKDAYS(M3,N3,\$I\$2:\$I\$5).

Compare the two formulas. The relative references changed from M2 and N2 to M3 and N3. The absolute references stayed pointed to cells I2 through I5. Formulas that contain some relative references and some absolute references are very common. You can copy the formula throughout the spreadsheet to reference a variety of date ranges while maintaining a fixed reference to the list of holidays. For more information about how to use absolute and relative references, please refer to my article in the March/April 2015 issue.

### Using NETWORKDAYS with Different Weekend Dates

You might be thinking this would be great for my company, but we are normally open Saturdays. Another scenario may be a practice that is open seven days per week and has

FIGURE 8

	L	M	N	O	P
1					
2		12/20/2017	12/30/2017		10 Total Days
3					11 Count Both Start and End Days
4					8 Network Days
5					6 Network Days with Holidays
6					4 NETWORKDAYS.INTL
7					(Wednesday, Saturday, Sunday)

different weekend dates for some employees. If this is your problem, NETWORKDAYS.INTL is your friend. The syntax for NETWORKDAYS.INTL is similar to the NETWORKDAYS function, with an added weekend parameter between the end date and the list of holidays. The syntax is NETWORKDAYS.INTL(start\_date, end\_date, weekend, holidays).

There are two ways to answer the weekend parameter. First, Excel has a predefined list of weekends as shown in Figure 7. For example, the number seven treats Friday and Saturday as weekends instead of Saturday and Sunday. What if you have a provider who takes every Wednesday off, in addition to Saturday and Sunday? The second way to answer the weekend parameter is by entering a seven-digit code. Each of the seven digits represents a day of the week, starting with Monday. The number 1 represents a non-workday, and 0 represents a workday. You can only use 1 and 0 in this weekend code. Cell O6 in Figure 8 counts the number of workdays between Dec. 20 and Dec. 30 for a provider who takes every Wednesday, Saturday, and Sunday off, plus company holidays. The four workdays are Tuesday, Dec. 21; Tuesday, Dec. 26; Thursday, Dec. 28; and Friday, Dec. 29. The formula in cell O6 is =NETWORKDAYS.INTL(M2,N2,"0010011", \$I\$2:\$I\$5). Note the 0010011 code is what makes Wednesday, Saturday, and Sunday non-work days.

There are more helpful Excel functions to come. Watch for more functions in the next issue of RCM Advisor. For dozens of free articles and hundreds of free videos on using Excel in a medical practice, please visit [www.mooreolutionsinc.com](http://www.mooreolutionsinc.com) ■

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