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## Lesson 7      Date and Time Functions and Insert Function

### Lesson Topics

- Date and Time Functions and Formats
- The Insert Function Dialog Box

### Lesson Objectives

At the end of the lesson, you will be able to:

- Explain the importance of the serial date;
- Use the NOW function to display the current date and time;
- Use the Date and Time formats to format cells;
- Use the DATE and TIME functions to enter fixed dates and times;
- Use date and time values in calculations;
- Use the Insert Function dialog box to enter functions and their arguments in a workbook.

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### Student Files Used

You will use the following files from your student folder:

- Invoices 1
- Invoices 2

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## Date and Time Functions and Formats

There are several functions that let you display dates. Excel thinks of a date as the number of days from January 1, 1900 to the nearest second. This is called a *serial date*. Since this is not the way humans think of dates, the number can be formatted to look like a standard date.

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### The NOW Function

The NOW function displays the current date and time, which is updated each time the workbook is opened or when Excel calculates the other formulas in the document.

1. **Open a new workbook.**
2. **Change the Standard Width to 15. (On the Format menu, point to *Column*, choose *Standard Width*, change the *Standard Width* to 15 and click OK.)**
3. **In A1, type =NOW() and then tap the ENTER key.**

The current date and time appear in the cell. For the time, Excel is using the 24-hour clock. For example, 9:35 AM is displayed as 9:35. After 12:00 noon, the numbers keep increasing — 1:00 PM, for example, is 13:00 and 4:55 PM is 16.55.

4. The date and time are appearing in readable format, because Excel has automatically formatted the cell with a *Date* format. If you remove the formats from this cell, the *General* format will be applied.

**Go to A1.**

5. **On the Edit menu, point to *Clear*.**
6. **On the submenu, choose *Formats*.**

A relatively large number appears in the cell. This is the *serial date*. The numbers to the left of the decimal point are the number of days since January 1, 1900. The numbers to the right of the decimal point represent the fraction of a day that has passed since midnight. The Serial date is what Excel uses to perform date and time calculations.

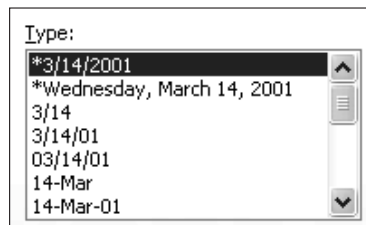
**Tip:** You can use CTRL/; (semicolon) to enter the current date in a cell. Unlike the NOW() function, this date will not be updated.

## Date Formats

The Number tab contains predefined date formats, which you can apply to cells. You are going to apply different *Date* formats to A1.

1. **A1 should be the active cell.**
2. **On the Format menu, choose *Cells*.**
3. **If necessary, click the Number tab.**
4. **In the *Category* list box, choose *Date*.**

In the *Type* list box, notice the different date formats.



5. **In the *Type* list box, choose the *3/14/01* option.**

At the top of the dialog box, notice the sample date. It will be the date you are taking this lesson.

6. **Click OK.**

Notice that the serial date has been formatted to something more recognizable.

7. You are going to see samples of the other *Date* formats.

**On the Format menu, choose *Cells*.**

8. **Verify that the Number tab is displayed, and that *Date* is selected in the *Category* list box.**

9. **In the *Type* list box, scroll down and choose the *March 14, 2001* format.**

In the *Sample* box, notice today's date.

10. **Choose three other formats and see how the sample changes.**
11. **Click Cancel.**

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Once you choose a format for a particular cell, you can enter the date in any recognizable format — Excel will then convert it to the format of the cell. You are going to format B1 with a particular date format and then enter a date with a different date format.

1. **Go to B1.**
2. **On the Format menu, choose *Cells*.**
3. **In the *Category* list box of the **Number** tab, choose *Date*.**
4. **In the *Type* list box, choose the *March 14, 2001* format.**
5. **Click OK.**
6. **In B1, type 8/12 and then tap the ENTER key.**

Notice the contents of the cell. Since the cell has been formatted with a long date format, Excel converted 8/12 into *August 12, 2007* (or whatever the current year is).

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Remember, Excel treats the date as a number. If you enter a number into a cell that has been formatted with the Date category, Excel will assume that you are entering a serial date and will then convert it to a more recognizable format. You are going to enter some numbers into B1.

1. **Go to B1.**
2. **Type 2 and then tap the ENTER key.**

Notice the results. Since the cell has the Date format applied to it, Excel assumed that the number you entered was a serial date. Therefore, it converted the serial date into a more recognizable format. Since the serial date is the number of days from January 1, 1900, a serial date of 2 translates to January 2, 1900.

3. **Type different numbers (i.e., serial dates) into B1 and notice the date change. (Include decimal points and notice that Excel includes the time on the Formula bar.)**

**Note:** It is not necessary to use the Format Cells dialog box to apply a date format to a cell. You can enter a date directly into a cell and the cell will

automatically have a date format. The resulting format may not always be as expected, however, so it is usually easiest to use the Format Cells dialog box when choosing date formats.

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## Time Formats

Excel has predefined time formats. You are going to apply different Time formats to A2.

1. **Go to A2.**
2. If you enter a value in one of Excel's time formats, the cell will be formatted automatically using the *Time* category.

**Type 4:35 AM and use CTRL/ENTER to stay in the cell.**

Excel has formatted the cell. It assumes that you want a time format and it applies one to the cell.

3. The Formula bar not only displays the time, but seconds also.

**In A2, notice the time on the Formula bar (4:35:00 AM). The last two zeros are for seconds, if there are any.**

4. You are going to change the time format.

**A2 should be the active cell.**

5. **On the Format menu, choose *Cells*.**
6. **On the Number tab, choose *Time* in the *Category* list box.**

In the *Type* list box, notice the different time formats.

7. **In the *Type* list box, choose the *13:30* time format. This format uses the 24-hour clock.**

In the *Sample* box, notice the sample time.

8. **Click OK.**

Notice how the current time is displayed. *AM* has been removed from the format although the Formula bar displays *AM*.

9. **In A2, type: 7:30 PM and click the check box.**

Notice that 19:30 is displayed. The Formula bar, however, uses the standard time convention (7:30:00 PM).

10. **On the Format menu, choose *Cells*.**
11. **Verify that *Time* is selected in the *Category* list box.**
12. **In the *Type* list box, choose some of the other time formats and notice how the time is displayed in the *Sample* box.**
13. **Click *Cancel*.**

**Note:** Always keep in mind that *Date* and *Time* formats are like all other formats. They can be copied and cleared.

## Fixed Dates and Times

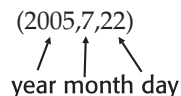
The *DATE* and *TIME* functions let you enter fixed dates and times that will not change and can then be used in calculations. You enter them this way:

=DATE(year,month,day)

=TIME(hour,minute,second)

1. **Go to A3.**
2. **Type =DATE(05,7,22) and use CTRL/ENTER.**

The following information is enclosed within the parentheses:

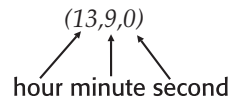
(2005,7,22)  


Notice that the cell is automatically formatted with a format in the *Date* format category that uses a year — 7/22/2005 appears in the cell.

**Note:** Using the *DATE* function, you must type four digits for years after 1999 — otherwise, Excel will assume 05 means 1905. (This is not true when you simply type a date into a cell, such as 5/5/09. In this case, Excel interprets and formats the year as 2009.)

3. You are going to type a fixed time.  
**Go to A5.**
4. **Type =TIME(13,9,0) and use CTRL/ENTER.**

The following information is enclosed within the parentheses:



Notice that the cell is automatically formatted with a *Time* format — 1:09 PM appears in the cell.

- 5. Go to A6 and type another fixed time. Remember to add 12 to any time after 1 PM. Format the cell with the Time format of your choice.**

- 6. Close the workbook. It will not be used again.**

**Tip:** You can use CTRL/SHIFT/: (colon) to enter the current time in a cell.

## Date Calculations

Since Excel treats dates as numbers, you can use them in calculations. You are going to do this with the workbook *Invoices 1*.

- 1. Open *Invoices 1*.**

	A	B	C	D	E
1	<b>Invoices</b>				
2					
3	<b>Invoice</b>	<b>Invoice</b>	<b>Due</b>	<b>Date</b>	
4	<b>Number</b>	<b>Date</b>	<b>Date</b>	<b>Paid</b>	<b>Difference</b>
5					
6	Invoice 001	39367		39390	
7	Invoice 002	39378		39413	
8	Invoice 003	39400		39412	
9	Invoice 004	39414		39454	
10	Invoice 005	39420		39435	
11	Invoice 006	39433		39455	

- 2. Notice that the dates have not been formatted. You are going to format the cells containing dates.**

**Select B6:D11.**

- 3. On the Format menu, choose *Cells*.**
- 4. If necessary, click the Number tab.**
- 5. In the Category list box, choose *Date*.**
- 6. In the Type list box, choose the *14-Mar-01* format.**
- 7. Click OK.**

Notice the formatted dates. Although 07 appears in the cell as the date because that is the format chosen, 2007 appears on the Formula bar since the year is greater than 1999.

8. You are going to calculate the *Due Date*, which is 30 days from the *Invoice Date*.

**Go to C6.**

9. **Type =B6+30 and tap the ENTER key.**

11-Nov-07 appears in the cell. It displays as a date, because you set this cell to a date format a moment ago.

10. **Copy this formula to C7:C11.**

11. You are going to find out how long it took to get paid.

**Go to cell E6.**

12. **Type =D6-B6 and tap the ENTER key.**

The result of the formula is a number (23), because this cell is not formatted as a date.

13. **Copy the formula in cell E6 to the range E7:E11.**

Your screen should look like the following:

	A	B	C	D	E
1	<b>Invoices</b>				
2					
3	<b>Invoice</b>	<b>Invoice</b>	<b>Due</b>	<b>Date</b>	
4	<b>Number</b>	<b>Date</b>	<b>Date</b>	<b>Paid</b>	<b>Difference</b>
5					
6	Invoice 001	12-Oct-07	11-Nov-07	4-Nov-07	23
7	Invoice 002	23-Oct-07	22-Nov-07	27-Nov-07	35
8	Invoice 003	14-Nov-07	14-Dec-07	26-Nov-07	12
9	Invoice 004	28-Nov-07	28-Dec-07	7-Jan-08	40
10	Invoice 005	4-Dec-07	3-Jan-08	19-Dec-07	15
11	Invoice 006	17-Dec-07	16-Jan-08	8-Jan-08	22

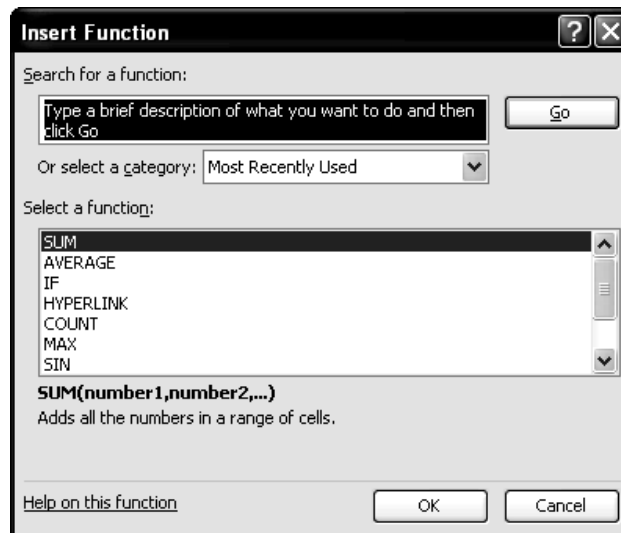
## The Insert Function Command

Rather than type a function manually, you can use the *Insert Function* to enter a function. It is often easier. You are going to use the Insert Function command to create a formula that determines if the payment was late.

1. **Open Invoices 2. It should be the same as your Invoices 1 after you made changes to it in the last section.**

2. **Go to F6.**
3. **On the Insert menu, choose *Function*.**

The Insert Function dialog box appears.

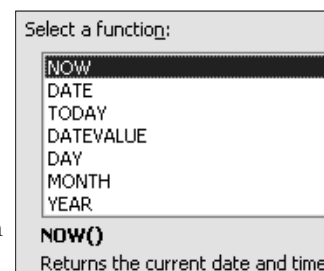


The *Or select a category* drop-down list box lists the broad categories of functions. When *Most Recently Used* is chosen in the *Or select a category* box, the last ten functions used will be displayed in the *Select a function* list box below. When *All* is chosen in the *Or select a category* box, every function in every category is displayed in the function box.

4. The *Search for a function* box is useful if you don't know what category to look in.

**In the *Search for a function* box, highlight the text, type date and tap the ENTER key.**

Notice the Date and Time functions listed in the *Select a function* list box. Three of these functions you already know — *DATE*, *NOW*, and *TIME*. Underneath the list box, notice the description of the selected function. In the lower left corner of the dialog box, the *Help on this function* hyperlink will

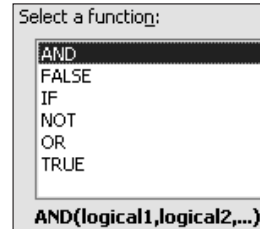


show you the Microsoft Excel Help window with a topic on the selected function.

5. You are going to write the following IF test:  
`=IF(E6<=30,"On time","Overdue")`

**In the Or select a category list box, choose Logical.**

Notice the list of Logical functions. →



6. **In the Function name list box, select IF.**

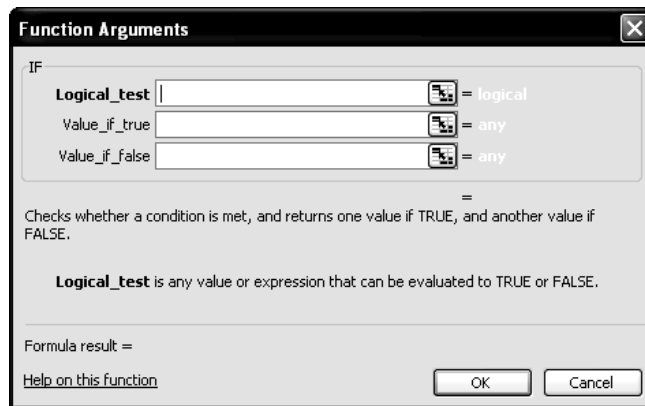
Below the list boxes, notice the description and the syntax of the IF function.

**IF(logical\_test,value\_if\_true,value\_if\_false)**

Checks whether a condition is met, and returns one value if TRUE, and another value if FALSE.

7. **Click OK.**

The second dialog box appears. This is the Function Arguments dialog box. You can move this box around if you need to see items on the worksheet underneath it. You can also click a Collapse dialog button at the right of each text box to temporarily replace the dialog box with the text box. Clicking the same button on the text box restores the dialog box.



Notice that Excel has already begun to enter the formula on the Formula bar and in F6.

8. **In the Logical\_test text box, type: E6<=30**

Notice that the actual result of the logical test, *TRUE*, appears to the right of the text box.

**9. Tap the TAB key.**




- 10.** You are going to write the true result. You do not need to type text in quotes. Excel inserts them for you.

**Type On Time and then tap the TAB key.**

Notice that Excel added the quotation marks.

- 11. For the false result, type Overdue and tap the TAB key.**

The three text boxes should look like this:

Logical_test	E6<=30		= TRUE
Value_if_true	"On Time"		= "On Time"
Value_if_false	"Overdue"		= "Overdue"

Also notice, near the bottom of the dialog box, *Formula Result = On Time*.

**12. Click OK.**

Notice *On Time* in F6 and the function on the Formula bar.

**13. Copy the function to F7:F11.**

Notice the results. 

**Note:** When you choose the Insert Function command, the Insert Function dialog box

appears unless the active cell contains a function, in which case the Function Arguments dialog box appears.

ence	
23	On Time
35	Overdue
12	On Time
40	Overdue
15	On Time
22	On Time

There is an Insert Function button on the Formula bar, which is an alternative to the Insert Function command. As with the Insert Function command, the button displays the Function Arguments dialog box if the active cell already contains a function.

**1. Click in an empty cell.**

- 2. Click the Insert Function button on the Standard toolbar.** 



Notice the Insert Function dialog box.

- 3. Click Cancel.**
- 4. Go to F6.**
- 5. Click the Insert Function button.**

Notice the Function Arguments dialog box.

- 6. Click Cancel.**

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*End of Lesson 7*