ADVANCED FUNCTIONS AND TEMPLATES

Chapter Objectives

By the time you finish this chapter, you should be able to identify the following terms:

- ❏ IF
- ❏ PMT
- ❏ AND
- ❏ SLN
- ❏ SYD
- ❏ FV

- ❏ COUNTIF
- ❏ VLOOKUP
- ❏ HLOOKUP
- ❏ Template
- ❏ Spreadsheet Solutions

By the time you finish this chapter, you should be able to perform the following tasks:

- ❏ Use Spreadsheet Solutions templates to create a workbook
- ❏ Use advanced functions
- ❏ Use nested functions

- ❏ Save a worksheet as a custom template
- ❏ Fix improperly entered formulas

INTRODUCTION

Now that you've learned Excel's basic functions, this chapter begins the focus on some of the advanced functions. You will learn to use **Financial** functions such as **PMT, FV,** and **SLN, Lookup & Reference** functions such as **VLOOKUP** and **HLOOKUP,** and **Logical** functions such as **IF, AND,** and **COUNTIF.** You will also learn how to use the **Paste Function** window to help enter the proper function arguments.

You will learn how to use the built-in worksheet templates by using Excel's Spreadsheet Solutions. **Spreadsheet Solutions** is a bank of predefined highly formatted office documents to use for common office tasks. These documents include purchase orders, invoices, and expense reports, among others. You will also learn how to create your own custom templates.

ADVANCED FUNCTIONS

Many financial functions include advanced variables in their arguments like **rate, nper, pv,** and **fv.** Pay careful attention to how the function syntax statements are displayed throughout the text. The essential variables are in bold. The nonessential variables are in Roman type. Examine the table below for the meanings of the common financial function variables. Note that **type** is an unusual variable in that it operates differently from function to function.

Variable	Definition
rate	interest rate per period
nper	number of periods
pv	present value (starting point)
fv	future value (ending point)

Table 3.1: Common Financial Variables

PMT

The **PMT** function is a **Financial** function used to find the periodic payment for a loan assuming a consistent payment amount and interest rate. This function is useful for projecting payments on loans for a car, house, piece of office equipment, and any other item where a monthly payment needs to be calculated. The syntax for the **PMT** functions is shown below.

$$=PMT(rate, nper, pv, fv, type)$$

The required elements of the argument are in bold. The **rate** is the interest rate that will be paid on the loan per period. **Nper** stands for the number of periods, or how many payments will be made on the loan. The **pv,** or present value, is the amount that is to be borrowed or financed.

Notice that **fv** and **type** are nonessential to the argument. The **fv,** or final value, is used when the final value after the payments are made is not **zero.** The **type** variable determines how the payments will be made: **0** means payments are made at the end of the period, and **1** means payments are made at the beginning of the period. If **type** is omitted, then Excel assumes a **type** value of **zero.**

Let's assume you wish to purchase a car for the amount of **$17,000.** You plan to finance it for **four years** with an annual interest rate of **8.5%.** You would enter the following function:

=PMT(8%/12,48,17000)
Explanation: The above function calculates the monthly payment on a **four-year** car loan priced at **$17,000** at **8.5% APR.** The result is displayed as a negative number in red.

Notice that the **rate** is divided by **12.** This is because interest is usually calculated monthly. **Four years** was converted to **48 months** in the second variable of the argument because this is how many payments will be made. The principle, or **pv**, is **$17,000.** Since commas are used to separate variables in an argument, they are not used in functions. Also, dollar signs are not needed in arguments. Since the final value would be zero, an **fv** value was not needed.

Exercise 3-1	**Use the PMT Function**

    I. Open the **Car Payment** workbook from your data disk, and save it as **Ex 3-1 Car Payment** on your work disk.
   II. Enter a formula that subtracts the **Down Payment** from the **Vehicle Price** in **cell B11.**
  III. Use the **PMT** function.
      a. Enter the function **=PMT(B6/12,B7,B11)** in **cell B13.**
         i. The **Monthly Payment** for the car is calculated and then displayed in red because money paid out automatically displays as negative.
      b. Put a minus sign in front of the **B11** cell address in the **PMT** function in **cell B13.**
         i. The **Monthly Payment** is now positive.
   IV. Change the price of the car to **$15,000.**
    V. Change the **# of Payments** to **48.**
      a. The **Monthly Payment** automatically updates to reflect the change.
   VI. Keep altering the price of the car until the monthly payment is as close to **$300.00** as you can get it.
  VII. Save, and close the workbook.

SLN

The **SLN** function is a **Financial** function for calculating yearly depreciation using the straight-line depreciation method. The **straight-line depreciation** method deducts the same amount each year from a depreciable item such as a car or piece of office equipment. The syntax for the **SLN** function is shown below.

$$=SLN(cost,salvage,life)$$

The **cost** variable is the original cost of the depreciable item. The **salvage** variable is a value for the item after it has completed its useful life. In other words, even a completely broken down car is worth at least **$50.00** to somebody. The salvage value is not depreciable. The **life** variable is the number of years that the item can be expected to perform the task for which it was designed.

For example, let's say your office has a copier machine that cost **$4,000,** has a salvage value of **$35.00,** and is expected to last **six years.**

=SLN(4000,35,6)
Explanation: This function calculates the yearly depreciation for the copier machine. If you wish to have a monthly depreciation amount, simply insert **/12** after the function to divide the result by **12.** The new formula for monthly depreciation would be identical to the one shown below.

=SLN(4000,35,6)/12

Exercise 3-2				Use the SLN Function			

	A	B	C	D	E	F	G	H
1	*Family Health Center*							
2	*Depreciation Schedule*							
3								
4								
5	**Xerox Copier**			**X-Ray Machine**			**EKG Machine**	
6	Cost	$ 2,500		Cost	$ 52,000		Cost	$ 2,400
7	Salvage Value	$ 75		Salvage Value	$ 1,000		Salvage Value	$ 100
8	Life Expectancy	5		Life Expectancy	15		Life Expectancy	10
9								
10	Yearly Dep.	$485.00		Yearly Dep.	$3,400.00		Yearly Dep.	$230.00
11								
12								
13								
14	Total Yearly							
15	Depreciation	$4,115.00						

I. Open the **Family Health Center** workbook from your data disk, and save it as **Ex 3-2 Family Health Center** to your work disk.
II. Use the **SLN** function.
   a. Enter the function =SLN(B6,B7,B8) in **cell B10,** and press the **Enter** key.
     i. The fixed yearly depreciation is calculated for the **Xerox Copier.**
   b. Enter the formula =SLN(E6,E7,E8) in **cell E10,** and press the **Enter** key.
     i. The fixed yearly depreciation is calculated for the **X-Ray Machine.**
   c. Enter the function =SLN(H6,H7,H8) in **cell H10,** and press the **Enter** key.
     i. The fixed yearly depreciation is calculated for the **EKG Machine.**
III. Format the depreciation amounts to **Currency Style** if necessary.
IV. Enter the formula =B10+E10+H10 to calculate the **Total Yearly Depreciation** in **cell B15.**
V. Save, and close the workbook.

SYD

The **SYD** function is a **Financial** function that returns the sum-of-the-years' digits depreciation of an asset for a specified period. When you use this type of depreciation schedule, most of the depreciation is calculated at the beginning of the term, and then the depreciable amount decreases as time goes by. The **SYD** function differs from the **SLN** function in that the depreciable amount decreases as the years go by rather than depreciating by the same amount every year. The syntax for the **SYD** function is shown below.

=SYD(cost,salvage,life,per)

The **cost** variable is the cost of the depreciable item. **Salvage** is the value of the item after the item has completed its useful life. The **salvage** value is not depreciable. The **life** variable refers to the number of years that the item can be expected to perform the task for which it was designed. The **per** argument is the year whose depreciation you want returned. A **1** would be the value after the first year of depreciation, and **2** would be the value at the end of the second year, etc.

For example, let's use the same $4,000 copier that we used for the **SLN** example. The salvage value is **$35.00,** and it has a useful life of **six years.** The period will be **1 year.**

=SYD(4000,35,6,1)
Explanation: Calculates the first year's depreciation for the copier using the sum-of-the-years' digits depreciation schedule.

Exercise 3-3	Use the SYD Function

	A	B	C	D	E
1	*Personal Depreciation Schedule*				
2					
3					
4					
5	*Computer*			*Printer*	
6	Price	$ 1,500.00		Price	$ 500.00
7	Salavge Value	100		Salavge Value	25
8	Life Expectancy	7		Life Expectancy	4
9	(In Years)			(In Years)	
10					
11		Depreciation			Depreciation
12	Useful Year	Amount		Useful Year	Amount
13	1	$350.00		1	$190.00
14	2	$300.00		2	$142.50
15	3	$250.00		3	$95.00
16	4	$200.00		4	$47.50
17	5	$150.00			
18	6	$100.00			
19	7	$50.00			

I. Open the **Personal Depreciation Schedule** workbook from your data disk and save it as **Ex 3-3 Personal Depreciation Schedule** to your work disk.

II. Use the **SYD** function.

    a. Enter the function =SYD($B$6,$B$7,$B$8,A13) in **cell B13**, and press the **Enter** key.

        i. This calculates the first year's depreciation for the computer.

    b. Copy the function down the column to calculate the depreciation for years 2 through **7**.

III. Use the **SYD** function.

    a. Enter the function =SYD($E$6,$E$7,$E$8,D13) in **cell E13**, and press the **Enter** key.

        i. This Calculates the first year's depreciation for the printer.

    b. Copy the formula down the column to calculate the depreciation for years 2 through **4.**

IV. Change the **Salvage Value** for the **Computer** to **$100,** and note the change.

V. Change the **Price** of the printer to **$500,** and note the change.

VI. Save, and close the workbook.

FV

The **FV** function is a **Financial** function used to find the future value of a periodic investment. This is a good function to use if you wish to see how much money you save over a fixed period of time with a fixed interest rate. The syntax for the **FV** function is shown below.

$$=FV(rate,nper,pmt,pv,type)$$

The **rate** variable is a fixed interest rate. The **nper** variable is the number of deposits you plan to make. The **pmt** amount is the fixed amount of money you deposit every month. The **pv** and **type** variables are nonessential to the argument. The **pv** variable is the present value of the account into which payments are made. In this case, the **type** variable indicates how the payments are made: **0** indicates that payments are made at the end of each period, and **1** indicates that payments are made at the beginning of each period.

Let's say you want to know how much money you will save over **ten years** if you deposit **$100** per month at a fixed interest rate of **8.50%.** You should have the following function.

=FV(8.5%/12,120,100)

Explanation: The first variable in the argument is the interest rate, which is divided by **12** because it is compounded monthly. The second variable is the number of monthly payments you will make. In this case **10 years * 12 months** is **120 payments.** The third variable is the amount of money you will deposit each month.

Exercise 3-4	**Use the FV Function**

I. Open the **Financial Future** workbook from your data disk, and save it as **Ex 3-4 Financial Future** to your work disk.

	A	B	C	D	E
1	*Financial Future*				
2					
3					
4					
5		Interest	# of Monthly	Monthly	Future
6	Event	Rate	Payments	Payment	Value
7	College Fund	8.00%	60	$ 100.00	($7,347.69)
8	Vacation Fund	7.50%	24	75.00	($1,935.50)
9	Car Fund	9.00%	12	50.00	($625.38)
10	Retirement Fund	7.50%	240	200.00	($110,746.15)

II. Remove gridlines.
    a. Click **Tools, Options** on the **Menu bar.**
       i. This activates the **Options** dialog box.
    b. Click the **View** tab if necessary. Click **Gridlines** under **Window options** to remove the check mark, and click **OK.**
       i. The worksheet gridlines disappear.

III. Use the **FV** function.
    a. Enter the function **=FV(B7/12,C7,D7)** in **cell E7,** and press the **Enter** key.
       i. The future value of investing **$100** per month at **8.00%** for **60 months** (five years) is calculated.
    b. Copy the function down the column to calculate the future values for the **Vacation Fund** and the **Car Fund.**

IV. Enter the figures for your **Retirement Fund** in **row 10.** You are planning to save **$200** per month for **20 years** (240 months) at **7.5%** interest.

V. Format the **Retirement Fund** row identical to the other events using the format painter, and widen the columns if necessary.

VI. Save, and close the workbook.

IF

The **IF** function is a **Logical** function used to test a condition. If the **logical_test** condition is met, then **value_if_true** is displayed in the cell; otherwise **value_if_false** is displayed. The syntax for the **IF** function is shown below.

$$=IF(logical\_test,value\_if\_true,value\_if\_false)$$

The easiest way to learn the **IF** function is to express your condition in plain English. For example, if you have 70 or higher average in algebra class, you pass; otherwise you fail. The 70 or higher is the **logical_test, Pass** is the **value_if_true** result, and **Fail** is the **value_if_false** result. The **IF** function is very popular in the real world. Look at the examples below showing the IF function.

If the sales amount in **cell B5** exceeds **$5,000,** then show a bonus of **100;** otherwise, show **0.**

=IF(B5>5000,100,0)

Explanation: The condition is if **cell B5** is **greater than 5000**, the **value_if_true** is **100** and the **value_if_false** is **0**. So if the sales amount in **cell B5** exceeds **$5,000**, then display **100**; otherwise display **0**.

Now let's say if the student's average in **cell B5** is **greater than or equal to 70**, then display **Pass**; otherwise display **Fail.**

=IF(B5>=70,"Pass","Fail")
Explanation: Quotation marks must surround each of the words used as variables in the function.

COUNTIF

The **COUNTIF** function is a **Logical** function used to count the number of cells in a range that meet specified criteria. This function consists of two variables: **range** and **criteria.**

<div align="center">

=COUNTIF(range,"criteria")

</div>

Let's say **Range A1:A5** contains the movie categories **Action, Drama, Action, Action,** and **Disney.** You want Excel to count how many **Action** movies are available.

=COUNTIF(A1:A5,"Action")
Explanation: A **3** would display because there are three action movies.

For instance, **Range A1:A5** contains sales values **5,000, 6,500, 3,200, 5,500,** and **1,200.** Let's say you want to know how many of those values are **greater than or equal to 5,000.**

=COUNTIF(A1:A5,">=5000")
Explanation: A **3** would display because three values equal or exceed 5,000.

Exercise 3-5	Use the IF and COUNTIF Function

I. Open the **George Washington High School** workbook from your data disk, and save it as **Ex 3-5 George Washington High School** to your work disk.
II. In **cell E7,** enter the **AVERAGE** function to calculate the averages, and copy the function down the column. Center and format the averages to **Number Style with no decimal places.**
III. Use the **IF** function.
  a. Enter the function =IF(E7>=69.5,"Pass","Fail") in cell **F7,** and press the **Enter** key.
    i. If the student's average is higher than or equal to 70, **Pass** displays; otherwise **Fail** displays.
    ii. 69.5 is used because if a grade is 69.5 or higher, it is rounded to 70.
  b. Copy the function down the column.
IV. Scroll down so the **Summary** area is completely visible.
V. Enter the **COUNTA** function to count the number of students in the **Range A7:A19** in **Cell B24,** and center the result.

	A	B	C	D	E	F
1						
2	**George Washington High School**					
3	**Student Grade Sheet**					
4						
5						
6	**Student**	**Math**	**Biology**	**English**	**Average**	**Pass/Fail**
7	Harris	75	85	54	71	Pass
8	Smith	75	85	87	82	Pass
9	Jones	66	99	87	84	Pass
10	Taylor	66	63	71	67	Fail
11	Gowens	61	67	75	68	Fail
12	Sanchez	64	68	79	70	Pass
13	Miller	85	98	55	79	Pass
14	Thompson	94	91	55	80	Pass
15	Vorhees	68	98	96	87	Pass
16	O'Reilly	57	98	85	80	Pass
17	Morici	65	55	80	67	Fail
18	Sabino	89	85	60	78	Pass
19	Hester	88	68	60	72	Pass
20						
21						
22	**Summary**					
23						
24	**# of Students:**	**13**				
25	**# of Passing Students:**	**10**				
26	**# of Failing Students:**	**3**				
27	**Failure Percentage:**	**23.1%**				

VI. Enter the function **=COUNTIF(F7:F19,"Pass")** in **cell B25,** and press the **Enter** key. Center the result.
  a. The number of passing students displays.

VII. Enter the function **=COUNTIF(F7:F19,"Fail")** in **cell B26,** and press the **Enter** key. Center the result.
  a. The number of failing students displays.

VIII. In **cell B27,** enter a formula that divides the number of failing students by the total number of students. Center the result, and format it to **Percent Style with one decimal place.**

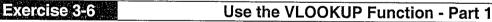IX. Save, and close the workbook.

VLOOKUP

The **VLOOKUP** function is a **Lookup & Reference** function that looks down the leftmost column of the **table_array** until the **lookup_value** is met and then looks across that row to the column specified by the **col_index_num** and returns a value. One application for the **VLOOKUP** function is when you wish to look up a commission percentage when you have varying sales amounts. The syntax for the **VLOOKUP** function is shown below.
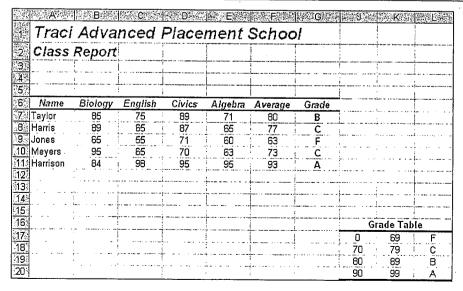
=VLOOKUP(lookup_value,table_array,col_index_num,...)

	A	B	C	E	F	G
1	*Palisade Auto Sales*					
2	*Commission Worksheet*					
3						
4	Rep	Sales	Commission %			
5	Miller	$8,500	12.00%			
6	Pekins	11,500	13.00%			
7	Gonzalez	19,500	14.00%			
8	Jackson	4,500	11.00%			
9					Commission Table	
10				0	5,000	11.00%
11				5,001	10,000	12.00%
12				10,001	15,000	13.00%
13				15,001	20,000	14.00%

Figure 3.1: Palisade Auto Sales

Examine the worksheet in Figure 3.1 above. The formula in **cell C5** should look like
=VLOOKUP(B5,$E$10:$G$13,3). The first variable in the argument is known as the
lookup_value, and it looks up and "sees" what's in **cell B5.** In this case, it "sees" **$8,500.** The
next variable tells Excel the range address of the table it should look at, otherwise known as the
table_arrray. Excel looks vertically up and down the leftmost column of the **Range**
$E$10:$G$13. Notice the lookup table is positioned down and to the right of the main
worksheet so if rows or columns are inserted and/or deleted, the rows and columns in the lookup
table will not be separated. The table range is absolute because you will want the table range to
remain constant when it is copied down the column. The number **$8,500** is found between **5,001**
and **10,000.** The last variable value is **3.** This is the **column_index_number** relative to the table
range where the percents are typed. In other words, the table range consists of three columns and
the result percents we want to display are in **column 3.** When **$8,500** is found, it counts to the
right **3 columns** and then displays **12.00%** in **cell C5.**

Exercise 3-6	**Use the VLOOKUP Function - Part 1**

	A	B	C	D	E	F	G	J	K	L
1	*Traci Advanced Placement School*									
2	*Class Report*									
3										
4										
5										
6	Name	Biology	English	Civics	Algebra	Average	Grade			
7	Taylor	85	75	89	71	80	B			
8	Harris	89	65	87	65	77	C			
9	Jones	65	55	71	60	63	F			
10	Meyers	95	65	70	63	73	C			
11	Harrison	84	98	95	95	93	A			
12										
13										
14										
15										
16									Grade Table	
17								0	69	F
18								70	79	C
19								80	89	B
20								90	99	A

I. Open the **Traci Advanced Placement School** workbook from your data disk, and save it as **Ex 3-6 Traci Advanced Placement School** to your work disk.
II. Notice the lookup table down and to the right of the main worksheet.
III. Calculate **Taylor's Average,** and then copy the function down the column.
IV. Use the **VLOOKUP** function.
   a. Enter the function =VLOOKUP(F7,$J$17:$L$20,3) in **cell G7,** and press the **Enter** key.
      i. A grade displays corresponding with what average the student has.
   b. Copy the function down the column to find grades for the remaining students.
   c. Center and bold the **Grades.**
V. Save, and close the workbook.

Exercise 3-7	Use the VLOOKUP Function - Part 2

I. Open the **Global Insurance Company** workbook from the data disk, and save it as **Ex 3-7 Global Insurance Company** to your work disk.
II. Use the **Go To** feature to go to **cell R50.** Look at the two tables for **Commission %** and **Tax Rate %.** Return to **cell A1** when finished.
III. Use the **VLOOKUP** function.
   a. Enter the function =VLOOKUP(B9,$M$30:$O$34,3) in **cell C9,** and press the **Enter** key.
      i. The **Commission %** is calculated and displayed in decimal form.
   b. Copy the function down the column.
      i. Commission percents are calculated for all sales reps.
IV. In the **Commission** column, enter a formula that multiplies the **Sales** by the **Commission %,** and then copy the formula down the column.
   a. Commissions are calculated for all sales reps.
V. Use the **IF** function.
   a. In the **Bonus** column, enter the function =IF(B9>$B$5,200,0), and press the **Enter** key. Copy the function down the column.
      i. Bonuses are calculated for sales reps whose sales exceed the bonus threshold of **$10,000.**
VI. In the **Total Pay** column, enter a formula that adds up the **Commission, Salary,** and **Bonus.** Copy the formula down the column.
   a. **Total Pay** is calculated for all sales reps.
VII. Use the **VLOOKUP** function.
   a. Enter the function =VLOOKUP(H9,$M$39:$N$49,2) in the **Tax Rate** column, and press the **Enter** key.
      i. The **Tax Rate** is calculated and displayed in decimal form.
VIII. Copy the function down the column.
   a. **Tax Rates** are calculated for all sales reps.
IX. Enter a formula that multiplies the **Total Pay** by the **Tax Rate** in the **Taxes** column,, and then copy the formula down the column.
   a. **Taxes** are calculated for all sales reps.
X. Enter a formula that subtracts **Taxes** from **Total Pay** in the **Net Pay** column, and then copy the formula down the column.

  a. **Net Pay** is calculated for all sales reps.
XI. Use the format painter to copy the format from the **Sales** column to all other columns except the **Commission %, Dependents,** and the **Tax Rate** columns.
XII. Enter the necessary functions in the **Summary Information** section of the worksheet, and format the results appropriately.
XIII. Make the following changes to the worksheet, and note each change in pay.
  a. **Taylor** has sales of **$11,000** and he now has **four dependents.**
  b. **Harrison** has sales of **$4,500.**
  c. **Sanchez** has only **3 dependents.**
XIV. Save, and close the workbook.

HLOOKUP

The **HLOOKUP** function is a **Lookup & Reference** function that works in a way similar to the **VLOOKUP** function. The **HLOOKUP** function is a reference function that looks across the first row of the **table_array** until the **lookup_value** is met, and then looks down that column to the row specified by the **row_index_num,** and returns a value.

=HLOOKUP(lookup_value,table_array,row_index_num,...)

	A	B	C	D	E	F	G	H	I	J
1	Ace Auto Parts									
2	Customer Invoice									
3										
4	Part#:	301								
5	Description	Fan Belt								
6	Price	$ 19.99								
7	Bin #:	75								
8										
9	Quantity:	3								
10										
11	Subtotal:	$ 59.97								
12										
13	Tax:	$ 4.20								
14										
15	Amount Due:	$ 64.17								
16										
17				Part #	301	302	303	304	305	306
18				Description	Fan Belt	Gas Cap	Oil Cap	Starter	Alternator	Air Filter
19				Price	19.99	6.99	8.99	129.99	99.99	17.99
20				Bin #	75	91	85	23	95	10

Figure 3.2: Ace Auto Parts

Examine the worksheet in Figure 3.2 above. The formula in **cell B5** should look like **=HLOOKUP(B4,$D$17:$J$20,2).** The first variable in the argument is known as the **lookup_value,** and tells Excel to look up and "see" what is in **cell B4.** In this case, Excel "sees" **301.** The next variable, **table_array,** gives Excel the range address of the table it will be searching. The range address of the **table_array** is absolute so that it will remain constant when the formula is copied to other locations. Working from left to right, Excel finds the value **301** in the second column of the table. Using the **row_index_num** value

2, the program goes down two rows and retrieves the value **Fan Belt.** This value is displayed in **cell B5.**

Exercise 3-8	Use the HLOOKUP Function

I. Open the **Ace Auto Parts** workbook from your data disk, and save it as **Ex 3-8 Ace Auto Parts** to your work disk.

II. Enter **301** in **cell B4.** Center the cell contents.

III. Use the **HLOOKUP** function.
   a. Enter the function **=HLOOKUP(B4,$D$17:$J$20,2)** in **cell B5,** and press the **Enter** key. Center the result.
      i. **Fan Belt** is displayed in **Cell B5.**
   b. Enter the function **=HLOOKUP(B4,$D$17:$J$20,3)** in **cell B6,** and press the **Enter** key. Format the results to **Currency Style.**
      i. **$19.99** is displayed in **Cell B6.**
   c. Enter the function **=HLOOKUP(B4,$D$17:$J$20,4)** in **cell B7,** and press the **Enter** key. Center the results.
      i. **75** is displayed in **Cell B7.**

IV. Enter **2** in **cell B9.** Center the cell contents.

V. Enter a formula in **cell B11** that multiplies the **Price** by the **Quantity.** Format the result to **Currency Style.**

VI. Enter a formula in **cell B13** that multiplies **Subtotal** by **7%.** Format the result to **Currency Style.**

VII. Change the **Part #** in **cell B4** to **303** and **Quantity** in **cell B9** to **5.**

VIII. Save, and close the workbook.

AND

The **AND** function is a **Logical** function used to test a condition with multiple arguments. The **AND** function returns **TRUE** if all the arguments are true, and **FALSE** if any of the arguments are false. It is somewhat similar to the **IF** function. In fact, the **AND** function is often used within an **IF** function when testing multiple arguments. When one function is used within another, it is called a **nested function.** The syntax for the **AND** function is shown below.

$$=AND(logical1,logical2,...)$$

In the worksheet below, the letter grade is determined by a nested function consisting of the **IF** and **AND** functions. In **Cell C8,** the formula is **=IF(AND(B8>=90,B8<=100),"A","").** In plain English the formula would sound like this: If the grade in **Cell B8** is greater than or equal to 90 and less than or equal to 100, then display **A,** otherwise display nothing. In the **B Students** column the formula would look like **=IF(AND(B8>=80,B8<90),"B","").**

	A	B	C	D	E	F	G
1	*Data Learning Center*						
2	*Student Grade Breakdown*						
3							
4							
5							
6							
7	Name	Grade	A Students	B Students	C Students	D Students	F Students
8	G. HARRIS	84		B			
9	T. MELLET	91	A				
10	J. KELLEY	74			C		
11	N. FLANDERS	69				D	
12	M. SANCHEZ	74			C		

Figure 3.3: Data Learning Center

Exercise 3-9	Nested Function with IF and AND

I. Open the **Data Learning Center** workbook from your data disk, and save it as **Ex 3-9 Data Learning Center** on your work disk.

II. Use nested functions with **IF** and **AND.**
   a. In **cell C8**, enter the function =IF(AND(B8>=90,B8<=100),"A",""). Copy the formula down the column, and center the results.
      i. **A Students** are displayed.
   b. In **cell D8**, enter the function =IF(AND(B8>=80,B8<90),"B",""). Copy the formula down the column, and center the results.
      i. **B Students** are displayed.
   c. In **cell E8**, enter the function =IF(AND(B8>=70,B8<80),"C",""). Copy the formula down the column, and center the results.
      i. **C Students** are displayed.
   d. In **cell F8**, enter the function =IF(AND(B8>=60,B8<70),"D",""). Copy the formula down the column, and center the results.
      i. **D Students** are displayed.

III. In **cell G8**, enter the function =IF(B8<60,"F",""). Copy the formula down the column, and center the results.

IV. Change **Mellet's** grade to **86**, and change **Flanders's** grade to **93.**

V. Save, and close the workbook.

TEMPLATES

You've probably found yourself constantly recreating worksheets with many of the same attributes, such as worksheet titles and column headings. It can become very cumbersome and time-consuming if you have to keep creating worksheets with the same general information from scratch. To save time, you can save a skeleton worksheet as a template. A **template** is simply a worksheet with general information pre-entered such as titles, column/row headings, and formulas. The data area of the worksheet is usually left blank. This way, whoever needs to

create a new worksheet can just open the predefined template and enter the data. This saves time and, in the long run, money.

Custom Templates

Custom templates are workbooks you've created that contain standard worksheet information such as titles and formulas. After you build a "bare-bones" worksheet, save it with a special file format to the template folder on your computer's hard disk. You will then have access to it from the **New** dialog box. The wonderful thing about templates is that the original file will not be overwritten with another workbook file. A template workbook file must be saved with a different workbook name every time someone uses it.

Exercise 3-10		**Create and Save a Template**	

	A	B	C
1	DEF Company		
2	Personal Time Card		
3			
4	Employee Name:		
5	Hourly Rate:		
6			
7	Date	Hours Worked	Daily Pay
8	Monday		-
9	Tuesday		-
10	Wednesday		-
11	Thursday		-
12	Friday		-
13			
14	Total Pay:		$ -

   I. Open a new workbook.

   II. Widen **column A to 17 characters, column B to 14 characters,** and **columns C through D to 12 characters.**

   III. Build the worksheet illustrated above.

   IV. Format the title in **cell A1** to **Blue 18-point Times New Roman Bold Italic.**

   V. Format the subtitle in **cell A2** to **Blue 14-point Times New Roman Bold Italic.**

   VI. Bold the contents of **cells A4** and **A5.**

   VII. Format **cell B5** to **Currency Style with two decimal places.**

   VIII. Center and bold the column headings in **row 7.**

   IX. Center and format **Range B8:B12** for fractions.

   X. Enter the formula **=$B$5*B8** in **cell C8,** and copy it down through **cell C12.**

      a. Dashes display in the **Daily Pay** column because the reference cell addresses are empty.

   XI. Format the **Daily Pay** column to **Comma Style with two decimal places.**

      a. Dashes display instead of zeros.

   XII. In **cell C14,** use the **SUM** function to add the values in the **Daily Pay** column.

      a. A dash displays in the cell.

   XIII. Format **cell B14** to **Currency Style with two decimal places.**

        a. The dash displays with a currency symbol.
  XIV. Save the workbook as a template.
        a. Activate the **Save As** dialog box.
        b. Click the **Save as type** arrow, and select **Template** from the drop-down list.
           i. The workbook is now ready to be saved as a template file in the **Template** folder.
        c. In the **Filename** field, enter **Weekly Time Sheet,** and click **Save.**
           i. The workbook is saved as a template.
  XV. Close the workbook.
  XVI. Open a template file.
        a. Click **File, New** on the **Menu bar.**
           i. This activates the **New** dialog box.
        b. Double-click the **Weekly Time Sheet** template.
           i. The workbook opens to a blank time sheet.
  XVII. Enter **Sally Smith** in **cell B4** and **$12.00** in **cell B5.**
  XVIII. Enter the hours of **8.5** for **Mon, 8.25** for **Tue, 7.75** for **Wed, 6.75** for **Thu,** and **8** for **Fri.**
        a. **Total Pay** is calculated.
  XIX. Save the workbook as **Ex 3-10 Sally's Pay** to your work disk.
  XX. Close the workbook.

Spreadsheet Solutions

In addition to creating your own templates, you can use Excel's own built-in templates called Spreadsheet Solutions. **Spreadsheet Solutions** are a built-in set of highly formatted worksheet templates that are common in every business. Purchase orders, expense reports, and invoices are some examples of templates available as Excel's Spreadsheet Solutions. Spreadsheet Solutions are accessed by selecting the **Spreadsheet Solutions** tab in the **New** dialog box and double-clicking an icon for a spreadsheet solution.

Once you have opened a Spreadsheet Solution template such as the **Expense Report,** simply replace the existing information with your company's information. Very quickly you will have a functioning worksheet that you can save, print, and edit.

Exercise 3-11	Use Spreadsheet Solutions

  I. Open a Spreadsheet Solution template.
        a. Click **File, New** from the **Menu bar.**
           i. This activates the **New** dialog box.
        b. Click the **Spreadsheet Solutions** tab.
           i. This displays Excel's Spreadsheet Solutions workbooks.
        c. Double-click the **Purchase Order** icon, and click the **Enable Macros** button.
           i. Excel creates a **Purchase Order** workbook.
  II. Click the **Customize** button in the upper right of the template.
        a. This takes you to the **Customize Template** worksheet.
  III. Enter the following data in the **Company Information** area.

     a. **Company Name: Acme Widget Company**
     b. **Address: 6677 Highway 441**
     c. **City: Bridgeport**
     d. **State: CT**
     e. **ZIP Code: 06611**
     f. **Phone Number: 555-1212**
     g. **FAX Number: 555-1234**

IV. Click the **Purchase Order** worksheet tab at the bottom of the screen.
     a. The **Purchase Order** template is active, displaying the company information.

V. Enter the following information in the **Vendor** section.
     a. **Name: Johnson and Associates**
     b. **Address: 544 Highway 27**
     c. **City: Trumbull**
     d. **State: CT**
     e. **ZIP Code: 06611**
     f. **Telephone Number: 555-7747**

VI. Save the workbook as **Ex 3-11 Purchase Order** to your work disk.
     a. A dialog box will appear.

VII. Choose the **Create a New Record** option.

VIII. Close the workbook.

CHAPTER SUMMARY

❑ **PMT** is a **Financial** function used to calculate the monthly payment on a loan.

❑ **SLN** is a **Financial** function used to calculate the straight-line depreciation of an item like a copier machine or car.

❑ **SYD** is a **Financial** function used to calculate depreciation based on the sum-of-the-year's digits. The item is mostly depreciated in the beginning of the life cycle then decreases as time goes by.

❑ **IF** is a **Logical** function used to test a condition. If a certain condition exists, then the **value_if_true** result displays; if it doesn't, then the **value_if_false** result displays.

❑ **AND** is a **Logical** function used to test a condition with multiple arguments. It is often used within **IF** arguments. When one function is used within another, it is called a **nested function.**

❑ **VLOOKUP** is a **Lookup & Reference** function used to match a **lookup_value** with a value in the leftmost column of a table and display the result found in the table column number you specify.

❑ **HLOOKUP** is a **Lookup & Reference** function that looks across the first row of the **table_array** until the **lookup_value** is met and then looks down that column to the row specified by the **row_index_num** and returns a value.

❑ **FV** is a **Financial** function used to find the future value of an investment based on a fixed interest rate and payment.

❑ **Templates** are "skeleton" worksheets that contain the basic information for commonly prepared worksheets.

❑ **Spreadsheet Solutions** are Excel's built-in templates, and they include purchase orders, invoices, and expense reports.

❑ Save a "skeleton" workbook as a template file in the **Templates** folder to create a **custom template.**

CHAPTER 3 PROJECTS

Project 3-1		Use the PMT and SLN Functions					

	A	B	C	D	E	F	G	H
1	*My Monthly Payments*							
2								
3								
4								
5		Amount	Interest	Salvage	# of	Life Expect.	Monthly	Yearly
6	Item	Financed	Rate	Value	Payments	(in years)	Payment	Depreciation
7	Car	$14,500	9.50%	$500.00	60	10	$ 304.53	$ 1,400.00
8	Stereo	2,500	12.00%	100.00	24	7	$ 117.68	$ 342.86
9	Furniture	1,750	12.00%	100.00	12	8	$ 155.49	$ 206.25
10	Computer	1,500	10.00%	25.00	12	5	$ 131.87	$ 295.00
11	Television	1,000	17.00%	10.00	12	12	$ 91.20	$ 82.50
12								
13	Total Monthly Payments	$ 800.77						
14	Total Yearly Depreciation	$ 2,326.61						

I. Open the **My Monthly Payments** workbook from your data disk, and save it as **Proj 3-1 My Monthly Payments** to your work disk.

II. Format the worksheet title in **cell A1** to **Blue 20-point Tahoma Bold Italic.**

III. Make the background color for the column heading cells **Turquoise,** and use the **Borders** button to apply **All Borders** to the range.

IV. Shade the data range starting in **cell A7 Sky Blue,** and apply **All Borders** to the range.

V. Use the **PMT** function to calculate the monthly payment for the items, and format the data to **Currency Style with 2 decimal places.** Make sure the payment displays as a positive number.

VI. Use the **SLN** function to calculate straight-line depreciation for the items, and format the data to **Currency Style with 2 decimal places.**

VII. Add labels and formulas below the worksheet that display **Total Monthly Payments** and **Total Yearly Depreciation.**

VIII. Widen Column A to display the labels in their entirety, and format the Range B13:B14 to have two decimal places.

IX. Change the **Life Expectancy** of the **Television** to **12 years.**

X. Change the **Interest Rate** for the **Car** to **9.5%.**

XI. Insert a row between **Stereo** and **Computer,** and enter the item **Furniture.** The **Amount Financed** is **1,750.** The **Interest Rate** for the furniture is **12%.** The **Salvage Value** is **$100.** You will finance it for one year, and it has an **8-year Life Expectancy.**

XII. Copy the functions above to calculate the **Monthly Payment** and **Yearly Depreciation** for the **Furniture.**

XIII. Print to one page.

XIV. Save, and close the workbook.

Project 3-2	Use the IF and COUNTIF Functions

I. Open the **Joe's Auto Sales** workbook from the data disk, and save it as **Proj 3-2 Joe's Auto Sales** to your work disk.

II. Format the title and subtitle to **Red 16-point Arial,** and **Merge and Center** the titles across the worksheet.

	A	B	C	D	E	F
1	Joe's Auto Emporium					
2	Vehicle Inventory					
3						
4						
5	Make	Model	Year	Price	On-Hand	Re-Order
6	Honda	Civic	1998	$17,500	2	Yes
7	Honda	Accord	1997	12,500	3	No
8	Honda	Civic	1995	9,900	4	No
9	Toyota	Camry	1992	3,250	1	Yes
10	Toyota	Corolla	1994	5,500	2	Yes
11	Chevy	Blazer	1997	18,000	3	No
12	Chevy	Lumina	1996	8,500	2	Yes
13	Ford	Tempo	1985	1,200	4	No
14						
15						
16	*Summary Information*					
17						
18	# of Models:	8				
19						
20	Discount Cars:	5				
21						
22	Highest Price:	$18,000				
23						
24	Lowest Price:	$1,200				
25						
26	Average Price:	$9,544				

III. In the **Re-Order** column, use the **IF** function that displays **Yes** if the number of vehicles on-hand falls **below 3** and **No** if it doesn't. Copy the formula down the rest of the column, and center the results.

IV. In the **Summary Information** area, use the **COUNTIF** function in the **Discount Cars** cell that displays the number of cars that cost **less than $10,000.**

V. Use the necessary functions for the rest of the **Summary Information** data.

VI. Change the price of the **Chevy Blazer** to **$18,000.**

VII. Repair the formatting.

VIII. Print the worksheet.

IX. Save, and close the workbook.

Project 3-3 — Use the VLOOKUP Function

	A	B	C	D	E	F	G	H	I	J
1	*American Auto Parts*									
2										
3										
4										
5	Item #:	102		Quantity:	6					
6										
7										
8	Description:	Gas Cap								
9										
10	Price:	$ 6.99								
11										
12	Bin #:	87								
13										
14	Subtotal:	$ 41.94								
15							Item #	Description	Price	Bin #
16	Taxes:	$ 2.94					101	Fan Belt	17.99	65
17							102	Gas Cap	6.99	87
18	Amount Due:	$ 44.88					103	Radiator Hose	10.99	43
19							104	Air Filter	13.99	57
20							105	Spark Plugs	5.99	87

I. Open the **American Auto Parts** workbook from the data disk, and save it as **Proj 3-3 American Auto Parts** to your work disk.

II. Enter **101** in the **Item #** cell and **1** in the **Quantity** cell.

III. Enter **VLOOKUP** functions in the cells for **Description, Price,** and **Bin #** that look up the **Item #** cell and then display the proper piece of information from the lookup table.

IV. Format the results as displayed.

V. In the **Subtotal** cell, enter a formula that multiplies the **Price** by the **Quantity.**

VI. In the **Taxes** cell, enter a formula that multiplies the **Subtotal** by **7%.**

VII. In the **Amount Due** cell, enter a formula that adds the **Subtotal** to the **Taxes.**

VIII. Change the **Item #** to **103** and **Quantity** to **4.**

IX. Change the **Item #** to **102** and **Quantity** to **6.**

X. Print the worksheet.

XI. Save, and close the workbook.

Project 3-4 — Use the SYD Function

I. Open the **Computers-R-Us** workbook from the data disk, and save it as **Proj 3-4 Computers-R-Us** on your work disk.

II. Use the **SYD** function to calculate yearly depreciation for the computers and printers.

III. Change the **Quantity** of **Computers** to **12** and the **Salvage** value of the **Printers** to **$200.**

IV. Enter the proper function to display only the date in **cell A3.**

V. Repair the formatting if necessary.

VI. Print the worksheet.

VII. Save, and close the workbook.

	A	B	C	D	E
1	*Computers-R-Us*				
2	*Depreciation Schedule*				
3	7/6/01				
4					
5	*Computers*			*Printers*	
6	Cost:	$ 1,000		Cost:	$ 250
7	Quantity:	12		Quantity:	5
8	Total:	$ 12,000		Total:	$ 1,250
9	Salvage:	$ 250		Salvage:	$ 200
10					
11	Useful Year	Depreciation Amount		Useful Year	Depreciation Amount
12	1	$3,916.67		1	$262.50
13	2	$3,133.33		2	$225.00
14	3	$2,350.00		3	$187.50
15	4	$1,566.67		4	$150.00
16	5	$783.33		5	$112.50
17				6	$75.00
18				7	$37.50

Project 3-5   Use the HLOOKUP and VLOOKUP Functions

	A	B	C	D	E	F	G
1							
2	Student #:	106					
3							
4	*Sleepy Hill Elementry School*						
5	*Student Grade Report*						
6							
7	*Personal Information*						
8							
9	Last Name:	Jacobs					
10	First Name:	Melissa					
11							
12	Address:	322 Waylon Dr.					
13	City:	Trumbull		State:	CT	Zip:	06611
14							
15	*Academic Information*						
16							
17	Vocabulary:	91					
18	Reading:	61					
19	Arithmetic:	68					
20	Phys. Ed.:	71					
21							
22	Average:	73					
23							
24	Grade:	C					

I. Open the **Sleepy Hill Elementary School** workbook from the data disk, and save it as **Proj 3-5 Sleepy Hill Elementary School** to your work disk.
II. Use the **HLOOKUP** and **VLOOKUP** functions to display the student information and letter grade.
III. Enter a formula to calculate the average grade.
IV. Center the **Academic Information,** and **Student #.**
V. Enter the **Student #** for **Melissa Jacobs.**
VI. Print the **Student Grade Report** portion of the worksheet.
VII. Save, and close the workbook.

Project 3-6	Use the IF, AND, and TODAY Functions

I. Open the **Accounts Receivable** workbook on your data disk, and save it as **Proj 3-6 Accounts Receivable** on your work disk.
II. In **cell A3,** enter the function to display the current date.
III. In **cell D8,** enter the **IF** function with nested **TODAY** function to test the condition in the column heading. If the condition is met, then the amount should display. Otherwise, the nothing should display. Copy the function down the rest of the column.
IV. In **cell E8,** enter the **IF** function with nested **AND** and **TODAY** functions to test the condition in the column heading. If the condition is met, then the amount should display. Otherwise, the nothing should display. Copy the function down the rest of the column.
V. In **cell F8,** enter the **IF** function with nested **AND** and **TODAY** functions to test the condition in the column heading. If the condition is met, then the amount should display. Otherwise, the nothing should display. Copy the function down the rest of the column.
VI. In **cell G8,** enter the **IF** function with nested **TODAY** function to test the condition in the column heading. If the condition is met, then the amount should display. Otherwise, the nothing should display. Copy the function down the rest of the column.
VII. Format all the results to **Comma Style with no decimal places.**
VIII. Print the worksheet.
IX. Save, and close the workbook.

Project 3-7	Create a Save a Template

	A	B	C	D	E	F	G	H
1	American Consolidated, Inc.							
2	Revenue Worksheet							
3								
4								
5	Revenue	January	February	March	April	May	June	Total
6	Sales							
7	Consulting							
8	Dividends							
9								
10	Total							

I. Build the worksheet as shown above, and save it as **Proj 3-7 American Consolidated** to your work disk.
II. Widen **column A** to **14 characters,** and center the headings in **Range B5:H5.**
III. Enter **SUM** functions for the **Totals,** and format the two total areas to **Currency Style with no decimal places.**
IV. Format **Range B6:G8** to **Comma Style with no decimal places.**
V. Save the workbook as **Revenue Template** to the default location as a template.
VI. Close the workbook.
VII. Open the **Revenue Template** from the **New** dialog box.
VIII. Enter your own values into the worksheet, and save it as **Proj 3-7 2001 Revenue Projections** to your work disk.
IX. Print, and close the workbook.

Project 3-8	Use Spreadsheet Solutions

I. Create an **Expense Statement** workbook using Excel's Spreadsheet Solutions.
II. Save the workbook as **Proj 3-8 Bill's Expense Statement** to your work disk.
III. Click the **Select Employee** button, and select **Bill Lee.**
IV. Enter **1/1/99** for the **Date,** **$500** for the **Account, Seminar** for the **Description,** **$300** for **Accommodations,** **$400** for **Transportation,** **$100** for **Meals,** and **$50** for **Phone.**
V. Print the workbook.
VI. Save, and close the workbook.

CHAPTER CHALLENGE

Computer Operator

Please create a worksheet like the one I've illustrated below. Enter the proper formulas and functions to calculate the empty cells. You will need to use a LOOKUP function to display the **Discount %.** Format **Total** and **Actual Cost** columns identical to the **Price** column. Format the **Discount %** column to **Percent Style with one decimal.** Format the title in **cell A1** to **24-point Arial Bold Italic** and the subtitle in **cell A2** to **16-point Arial Bold Italic.** Print the worksheet. Delete the values from the **Number Purchased** column, and save the worksheet as a template with the name **Challenge 3-1 Discount Worksheet.**

Thanks
The Boss

	A	B	C	D	E	F	G	H	I
1	Thompson's Warehouse								
2	Discount Worksheet								
3									
4									
5			Number			Actual			
6	Item	Price	Purchased	Total	Discount %	Cost			
7	123	$ 1.29	100						
8	124	3.29	250						
9	125	4.99	325						
10	126	2.39	150						
11	127	3.39	75						
12									
13									
14							Discount Table		
15							0	100	10%
16							101	200	12%
17							201	300	13%
18							301	400	14%
19							401	500	15%