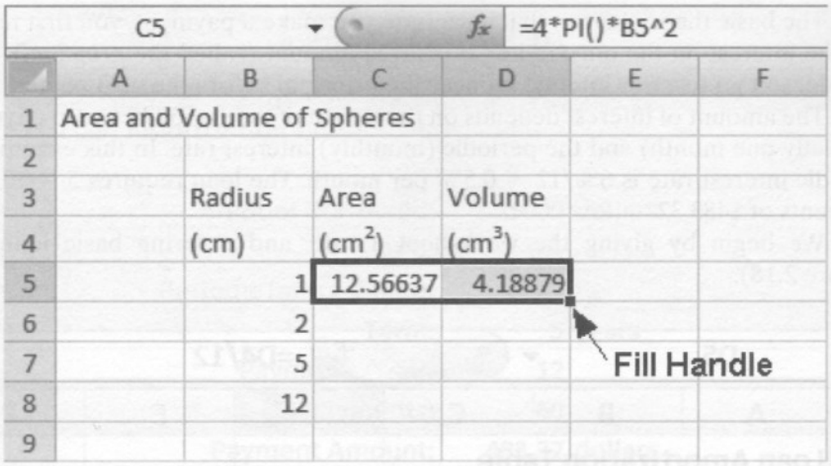

Figure 2.16
Selecting the cells to be duplicated.

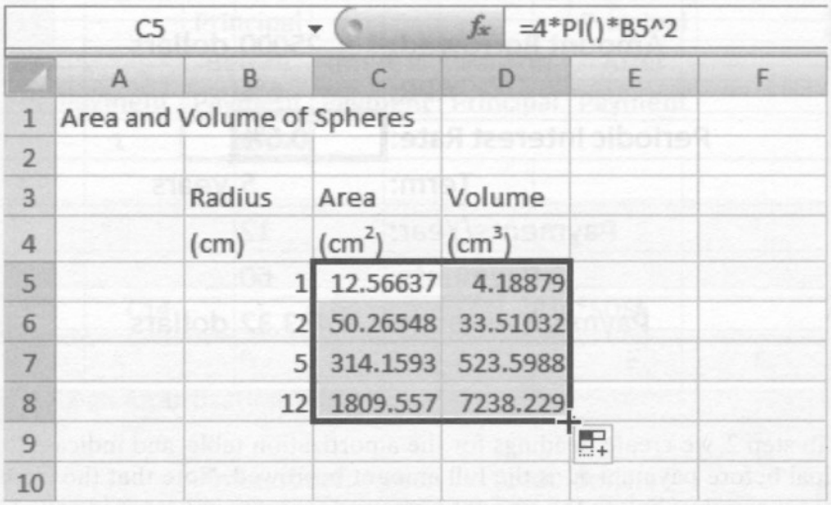

Figure 2.17
The result of duplicating the formulas using the Fill Handle.

There is yet another option when using the Fill Handle! Since the radius values were already entered into a column adjacent to the destination cells, you can select the original two formulas (C5:D5) and then double-click on the Fill Handle. Excel will automatically generate formulas for each radius value. The ability to double-click the Fill Handle to have Excel automatically complete a table can be very handy when you many rows to fill with formulas.

APPLICATION

Loan Amortization Table

When you borrow money to buy a vehicle or a home, the bank may provide you with a *loan amortization table* showing how much you still owe each month. In this application, we'll show you how to create your own amortization table.

Consider a $25,000 loan to buy a new pickup. The loan has an annual percentage rate (APR) of 6%, and you will be making payments for 5 years. Create an amortization table showing how much is left to be paid after each payment.

The basic theory here is that each time you make a payment, you first have to pay the interest on the outstanding borrowed amount (called the *principal*); whatever doesn't go towards interest reduces the principal before the next payment.

The amount of interest depends on the length of the period between payments (typically one month) and the periodic (monthly) interest rate. In this example the periodic interest rate is 6%/12 = 0.5% per month. The loan requires 5 × 12 = 60 payments of $483.32.

We begin by giving the worksheet a title, and entering basic loan data (Figure 2.18).

D5 f_x =D4/12

	A	B	C	D	E	F
1	Loan Amortization Table					
2						
3			Amount Borrowed:	25000	dollars	
4			APR:	6%		
5			Periodic Interest Rate:	0.5%		
6			Term:	5	years	
7			Payments/Year:	12		
8			Payments:	60		
9			Payment Amount:	483.32	dollars	
10						

Figure 2.18
Loan amortization table, step 1.

In step 2, we create headings for the amortization table, and indicate that the principal before payment #1 is the full amount borrowed. Note that the formula in cell B14 is simply a link to the amount borrowed that was indicated in cell D3. That is, cell B14 contains the formula `=D3` as shown in Figure 2.19.

For step 3, we calculate the interest on that principal (see Figure 2.20) by multiplying the "principal before payment" by the "periodic interest rate," or

```
C14: =B14*$D$5.
```

Note: The address of the periodic interest rate was made absolute in the formula above by using dollar signs as $D$5. By using absolute addresses whenever any of the input values in rows 3 through 9 is used in the table, the cell addresses for those input values will not change when the formula is copied down the table.

The calculation of interest payments based on periodic interest rates and remaining principal is termed *simple interest*. There are other ways to calculate interest payments, but simple interest is typically used for automobile and home loans.

B14 =D3

	A	B	C	D	E	F
1	Loan Amortization Table					
2						
3			Amount Borrowed:	25000	dollars	
4			APR:	6%		
5			Periodic Interest Rate:	0.5%		
6			Term:	5	years	
7			Payments/Year:	12		
8			Payments:	60		
9			Payment Amount:	483.32	dollars	
10						
11		Principal			Principal	
12		Before	Interest	Paid on	After	
13	Payment	Payment	Payment	Principal	Payment	
14	1	25000				
15						

Figure 2.19
Step 2: Creating table headings and identifying the initial principal.

C14 =B14*$D$5

	A	B	C	D	E	F
1	Loan Amortization Table					
2						
3			Amount Borrowed:	25000	dollars	
4			APR:	6%		
5			Periodic Interest Rate:	0.5%		
6			Term:	5	years	
7			Payments/Year:	12		
8			Payments:	60		
9			Payment Amount:	483.32	dollars	
10						
11		Principal			Principal	
12		Before	Interest	Paid on	After	
13	Payment	Payment	Payment	Principal	Payment	
14	1	25000	125			
15						

Figure 2.20
Step 3: Calculating the interest in the first month.

D14 =$D$9-C14

	A	B	C	D	E	F
1	Loan Amortization Table					
2						
3			Amount Borrowed:	25000	dollars	
4			APR:	6%		
5		Periodic Interest Rate:		0.5%		
6			Term:	5	years	
7			Payments/Year:	12		
8			Payments:	60		
9			Payment Amount:	483.32	dollars	
10						
11		Principal			Principal	
12		Before	Interest	Paid on	After	
13	Payment	Payment	Payment	Principal	Payment	
14	1	25000	125	358.32		
15						

Figure 2.21
Step 4: Determining how much was paid on principal with the first payment.

Next (step 4), we subtract the interest payment from the total payment amount to determine how much was paid on principal in the first month. (See Figure 2.21.)

D14: `=$D$9-C14` (Again, an absolute address was used for the payment amount.)

In step 5 (see Figure 2.22), the principal after the payment is determined as $25,000 − $358.32 = $24,641.68, or

E14: `=B14-D14`.

E14 =B14-D14

	A	B	C	D	E	F
1	Loan Amortization Table					
2						
3			Amount Borrowed:	25000	dollars	
4			APR:	6%		
5		Periodic Interest Rate:		0.5%		
6			Term:	5	years	
7			Payments/Year:	12		
8			Payments:	60		
9			Payment Amount:	483.32	dollars	
10						
11		Principal			Principal	
12		Before	Interest	Paid on	After	
13	Payment	Payment	Payment	Principal	Payment	
14	1	25000	125	358.32	24641.68	
15						

Figure 2.22
Step 5: Determining the principal after the first payment.

A15 =A14+1

	A	B	C	D	E	F
1	Loan Amortization Table					
2						
3			Amount Borrowed:	25000	dollars	
4			APR:	6%		
5			Periodic Interest Rate:	0.5%		
6			Term:	5	years	
7			Payments/Year:	12		
8			Payments:	60		
9			Payment Amount:	483.32	dollars	
10						
11		Principal			Principal	
12		Before	Interest	Paid on	After	
13	Payment	Payment	Payment	Principal	Payment	
14	1	25000	125	358.32	24641.68	
15	2	24641.68				
16						

Figure 2.23
Step 6: Starting the calculations for the second payment.

For step 6 (see Figure 2.23), we start the calculations for the second payment by increasing the payment number by one and using the payment #1 "principal after payment" as the "before payment" principal for payment #2.

A15: `=A14+1`.
B15: `=E14`.

Step 7. The last three calculations for payment 2 can be completed simply by copying the formulas in cells C14:E14 down to row 15. The results are shown in Figure 2.24. Notice that the interest payment has decreased slightly for payment 2 because it was calculated using a slightly smaller principal.

Step 8. Copy the formula in cell A15 down another 58 rows to handle all 60 payments. The result is shown in Figure 2.25 with many rows (19 through 71) hidden. (How to hide rows is the topic of Section 2.7.6.)

Step 9. To complete the table, select the formulas in cells B15:E15 (as shown in Figure 2.25), and double-click on the Fill Handle. Excel will copy the formulas in row 15 (payment 2) down to all 58 remaining rows. The first 10 payments are shown in Figure 2.26.

This example was included at this point in this chapter to illustrate how handy the Fill Handle is for completing tables (step 9). The appearance and readability of the amortization table could certainly be improved with some formatting, such as bolding the title and column headings, including dollar signs on currency values, and always presenting currency values to two decimal places (cents). These formatting topics are covered in the rest of this chapter.

C15 | =B15*$D$5

	A	B	C	D	E	F
1	Loan Amortization Table					
2						
3			Amount Borrowed:	25000	dollars	
4			APR:	6%		
5			Periodic Interest Rate:	0.5%		
6			Term:	5	years	
7			Payments/Year:	12		
8			Payments:	60		
9			Payment Amount:	483.32	dollars	
10						
11		Principal			Principal	
12		Before	Interest	Paid on	After	
13	Payment	Payment	Payment	Principal	Payment	
14	1	25000	125	358.32	24641.68	
15	2	24641.68	123.2084	360.1116	24281.57	
16						

Figure 2.24
Step 7: Copy the formulas in cells C14:E14 down to row 15 to complete the calculations for payment 2.

	A	B	C	D	E	F
10						
11		Principal			Principal	
12		Before	Interest	Paid on	After	
13	Payment	Payment	Payment	Principal	Payment	
14	1	25000	125	358.32	24641.68	
15	2	24641.68	123.2084	360.1116	24281.57	
16	3					
17	4					
18	5					
72	59					
73	60					
74						

Figure 2.25
Step 8: Establishing the number of payments.

	A	B	C	D	E	F
1	Loan Amortization Table					
2						
3			Amount Borrowed:	25000	dollars	
4			APR:	6%		
5			Periodic Interest Rate:	0.5%		
6			Term:	5	years	
7			Payments/Year:	12		
8			Payments:	60		
9			Payment Amount:	483.32	dollars	
10						
11		Principal			Principal	
12		Before	Interest	Paid on	After	
13	Payment	Payment	Payment	Principal	Payment	
14	1	25000	125	358.32	24641.68	
15	2	24641.68	123.2084	360.1116	24281.57	
16	3	24281.57	121.4078	361.9122	23919.66	
17	4	23919.66	119.5983	363.7218	23555.93	
18	5	23555.93	117.7797	365.5404	23190.39	
19	6	23190.39	115.952	367.3681	22823.03	
20	7	22823.03	114.1151	369.2049	22453.82	
21	8	22453.82	112.2691	371.0509	22082.77	
22	9	22082.77	110.4139	372.9062	21709.86	
23	10	21709.86	108.5493	374.7707	21335.09	

Figure 2.26
The completed amortization table (only 10 of 60 payments shown).

2.2.5 Using the Format Painter

The Microsoft Office programs include a handy feature called the *Format Painter*. In Excel 2007 it is part of the Clipboard Group on the Ribbon's Home tab, as shown in Figure 2.27.

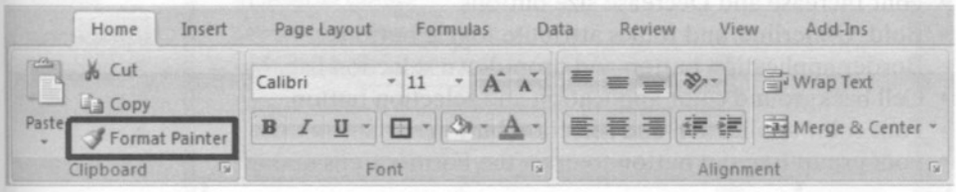

Figure 2.27
The [Format Painter] button.

The Format Painter is used to copy the format used in one cell to another cell or cell range, and nothing else (no values or formulas). This allows you to apply any number of formatting attributes to one cell, and then apply all of those attributes to other cells at one time. For example, if you have a portion of your worksheet looking just the way you want it to look, and have specified the following attributes: