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Computer Notes on Loan Repayment Schedule

As mentioned in Section 5.6.2, generating a loan payment schedule can be tedious. The power of an electronic spreadsheet can greatly facilitate the generation of such schedules. To illustrate how we might generate a loan repayment schedule with Excel, we will use the financial data in Example 5.13.

Using Exhibit 1 as a model, set up your Excel screen and specify the contract amount (C5), contract period (C6), and the interest rate (C7). Excel calculates the monthly payment (C8), with the principal (column E) as well as the interest (column F) itemized for each period. By separating the interest payment from the periodic payment, the remaining loan balance for each period (column G) can be generated.

The built-in loan functions available for Excel are as follows:

- PMT(*rate*, *nper*, *pv*, *fv*, *type*) returns the periodic payment for an annuity based on constant payments and a constant interest rate;
- IMPT(*rate*, *per*, *nper*, *pv*, *fv*, *type*) returns the interest payment for an investment for a given period; and
- PPMT(*rate*, *per*, *nper*, *pv*, *fv*, *type*) returns the principal payment for an investment for a given period, where

  rate is the interest rate per period.

  per specifies the period and must be in the range 1 to *nper*.

  nper is the total number of payment periods in an annuity.

  pv is the present value, or the lump-sum amount that a series of future payments is currently worth.

  fv is the future value, or a cash balance, you want to attain after the last payment is made. If *fv* is omitted, it is assumed to be 0 (the future value of a loan, for example, is 0).

  type is the number 0 or 1 and indicates when payments are due. If *type* is omitted, it is assumed to be 0. If payments are due at the end of the period, set *type* equal to 0. If payments are due at the beginning of the period, set *type* equal to 1.

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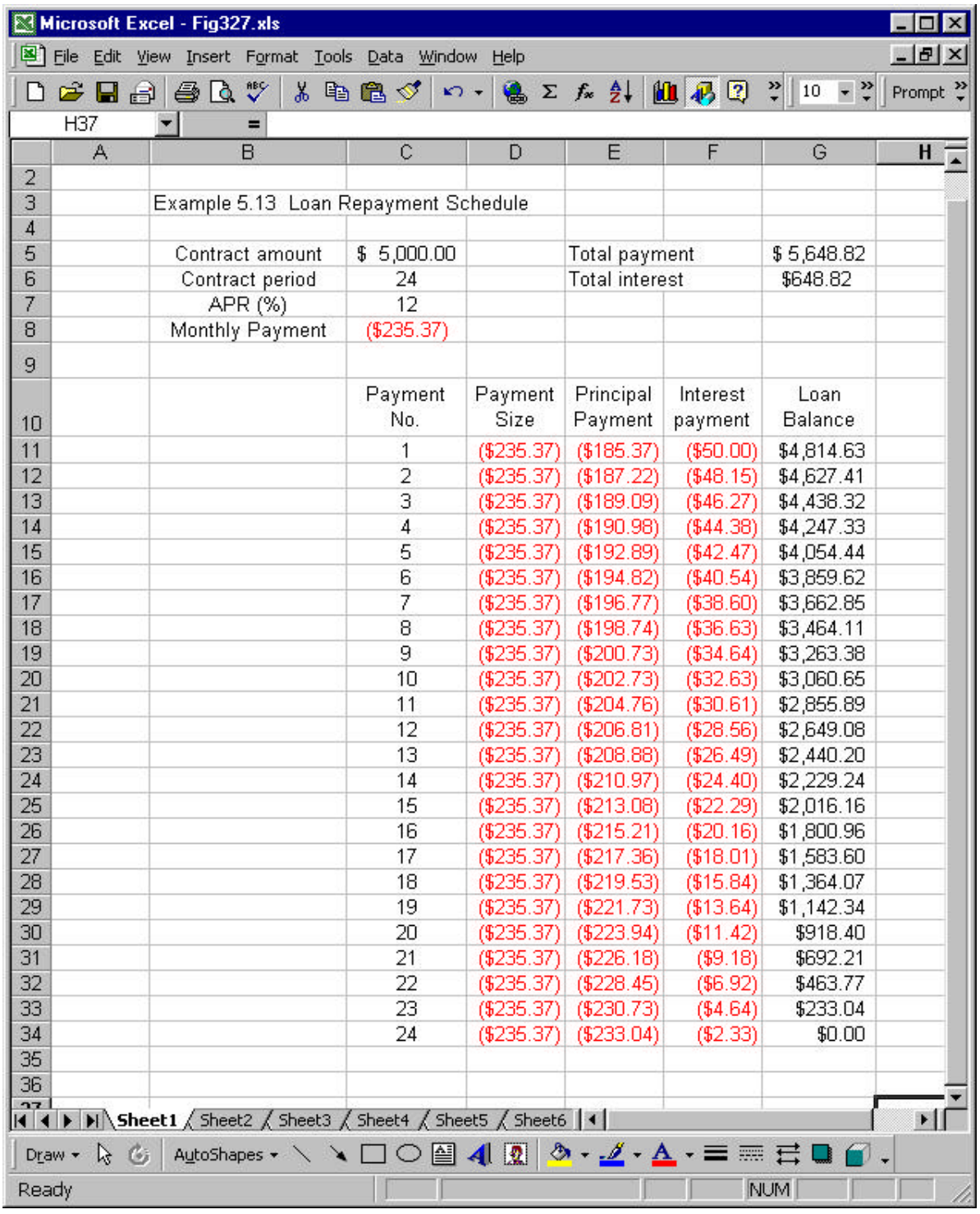

	A	B	C	D	E	F	G	H
2								
3		Example 5.13 Loan Repayment Schedule						
4								
5		Contract amount	$ 5,000.00		Total payment		$ 5,648.82	
6		Contract period	24		Total interest		$648.82	
7		APR (%)	12					
8		Monthly Payment	($235.37)					
9								
10			Payment No.	Payment Size	Principal Payment	Interest payment	Loan Balance	
11			1	($235.37)	($185.37)	($50.00)	$4,814.63	
12			2	($235.37)	($187.22)	($48.15)	$4,627.41	
13			3	($235.37)	($189.09)	($46.27)	$4,438.32	
14			4	($235.37)	($190.98)	($44.38)	$4,247.33	
15			5	($235.37)	($192.89)	($42.47)	$4,054.44	
16			6	($235.37)	($194.82)	($40.54)	$3,859.62	
17			7	($235.37)	($196.77)	($38.60)	$3,662.85	
18			8	($235.37)	($198.74)	($36.63)	$3,464.11	
19			9	($235.37)	($200.73)	($34.64)	$3,263.38	
20			10	($235.37)	($202.73)	($32.63)	$3,060.65	
21			11	($235.37)	($204.76)	($30.61)	$2,855.89	
22			12	($235.37)	($206.81)	($28.56)	$2,649.08	
23			13	($235.37)	($208.88)	($26.49)	$2,440.20	
24			14	($235.37)	($210.97)	($24.40)	$2,229.24	
25			15	($235.37)	($213.08)	($22.29)	$2,016.16	
26			16	($235.37)	($215.21)	($20.16)	$1,800.96	
27			17	($235.37)	($217.36)	($18.01)	$1,583.60	
28			18	($235.37)	($219.53)	($15.84)	$1,364.07	
29			19	($235.37)	($221.73)	($13.64)	$1,142.34	
30			20	($235.37)	($223.94)	($11.42)	$918.40	
31			21	($235.37)	($226.18)	($9.18)	$692.21	
32			22	($235.37)	($228.45)	($6.92)	$463.77	
33			23	($235.37)	($230.73)	($4.64)	$233.04	
34			24	($235.37)	($233.04)	($2.33)	$0.00	
35								
36								

Exhibit 1: Loan repayment schedule generated by Excel spreadsheet (Example 5.13)

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Before showing the cell formula and values used in Exhibit 1, note the difference between C7 and *$C$7*. The latter notation indicates the absolute cell location. Whenever a cell formula contains this absolute cell, Excel must use the data stored physically in that cell. Note: *The given APR interest rate must be divided by* 12 *to obtain effective interest per month.* To convert the interest rate to a decimal, you also need to divide the effective interest rate per payment period by 100. For example:

- In cell C8: = PMT($C$7/1200, $C$6, $C$5, 0) to calculate the monthly payment.
- In cell E11: = PPMT($C$7/1200, $C$11, $C$6, $C$5, 0) to calculate the principal payment for the first payment period.
- In cell F11: = IPMT($C$7/1200, $C$11, $C$6, $C$5, 0) to calculate the interest payment for the first payment period.
- In cell G6: = SUM(F11:F34) to calculate the total interest payment over the life of the loan.

As mentioned in the computer notes in Chapter 4, one of the most useful features of any spreadsheet is to allow you to do "what if" analyses relatively quickly. An example follows: What if you can borrow an amount at 9%, compounded monthly, instead of at 12%? Enter this new APR in cell C7, and you will see that Excel automatically recalculates (or updates) the entire worksheet.[1]

[1] Even when using the Copy function of Excel, whereby a piece of data (or cell formulas) can be copied into many cells simultaneously, you can see that to generate the Excel schedule, a great deal of manipulation was required. An alternative is to go to the book's web site described in Preface and download and use **EzCash**, which generates a loan repayment schedule in a much more efficient way.