

# Chapter 4

# Spreadsheets And Economic Analysis

## 4-1

Using Excel, determine the value of \$3,500 invested today 10 years from now if interest is 4% compounded quarterly.

### Solution

	A	B	C	D	E	F
1	<b>FV Calculations</b>					
2						
3	\$3500 invested at 4% compounded quarterly for 10 years					
4						
5	Rate	1%	per quarter			
6	n	40	quarters			
7	Payment	0	(no regular payments)			
8	PV	-\$3,500	(out-of-pocket expense)			
9	Type	0	(end-of-year payments)			
10						
11		\$5,211.02	FW			
12						

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### 4-2

What amount, at 3.25% annual interest, will generate annual payments of \$60,000 for a period of 20 years? Use Excel to solve.

#### Solution

B11		=		=PV(B5,B6,B7,B8,B9)				
	A	B	C	D	E	F	G	H
1	<b>Present Value Calculations</b>							
2	What amount, at 3.25% annual interest, will generate annual payments of \$60,000							
3	for a period of 20 years?							
4								
5	Rate	3.50%	per year					
6	n	20	years					
7	Payment	\$60,000						
8	FV	0						
9	Type	0						
10								
11		<b>-\$852,744.20</b>	<b>PV</b>					

### 4-3

Using Excel, determine the payment on a 5-year automobile loan of \$15,000 with 1.9% interest and monthly payments.

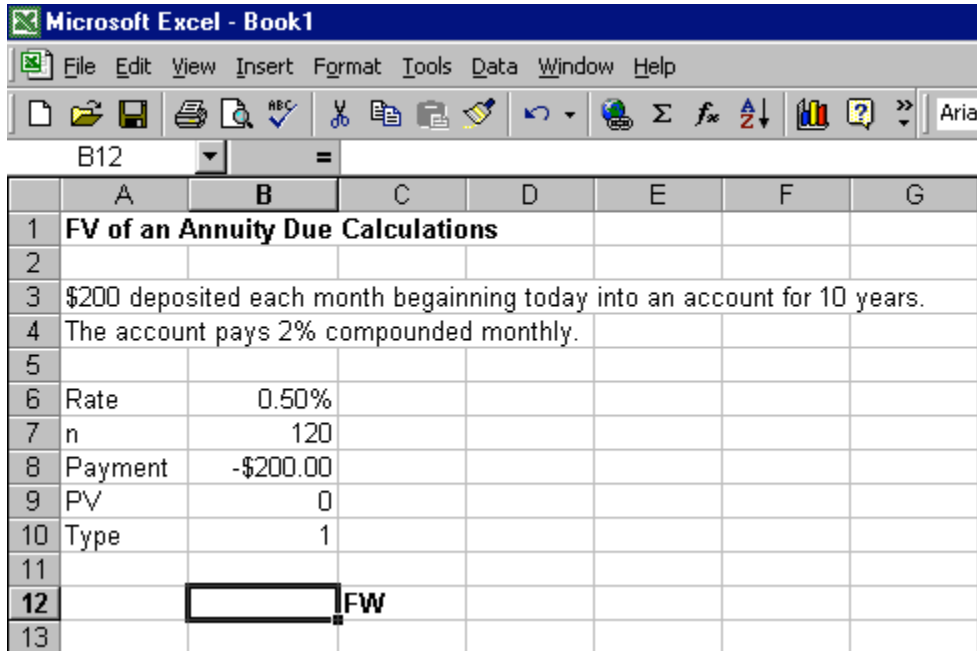
#### Solution

B12		=		=PMT(B6,B7,B8,B9,B10)			
	A	B	C	D	E	F	
1	<b>Payment Calculations</b>						
2							
3	What is the payment on a 5-year automobile loan of \$15,000						
4	at 19% with monthly payments?						
5							
6	Rate	0.1583%	per month				
7	n	60	months				
8	PV	-\$15,000	Loan amount				
9	FV	0					
10	Type	0	(end-of-period payments)				
11							
12	Payment	<b>\$262.26</b>					

### 4-4

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Determine the equation that must be supplied to complete the Excel spreadsheet. What is the value for B12?



**Solution**

$$B12 = FV(B6,B7,B8,B9,B10)$$

$$FW = \$32,939.75$$

**4-5**

ABC Block Inc. is considering replacing their wood shaving machine. The industrial engineer for ABC has initially selected the QuickShave machine. The machine has a first cost of \$35,000 and a salvage value of \$6,000 at the end of its seven year useful life. The cash flows associated with the machine are presented below. Assuming ABC's MARR is 6%, determine if the machine should be purchased.

Year	1	2	3	4	5	6	7
Cash flow(\$)	7,000	7,000	7,000	5,500	5,500	4,500	4,500

**Solution**

First find the PW of the cash flows.

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C6		=	=PV(\$D\$2,A6,0,-B6)
	A	B	C
1	<b>Net Present Value</b>		
2			<b>MARR =</b> 6%
3			
4	<b>Year</b>	<b>Income</b>	<b>PV</b>
5	0	-\$35,000	-\$35,000.00
6	1	\$7,000	\$6,603.77
7	2	\$7,000	\$6,229.98
8	3	\$7,000	\$5,877.33
9	4	\$5,500	\$4,356.52
10	5	\$5,500	\$4,109.92
11	6	\$4,500	\$3,172.32
12	7	\$10,500	\$6,983.10

Sum column C

C14		=	=SUM(C5,C12)
	A	B	C
1	<b>Net Present Value</b>		
2			<b>MARR=</b> 6%
3			
4	<b>Year</b>	<b>Income</b>	<b>PV</b>
5	0	-\$35,000	-\$35,000.00
6	1	\$7,000	\$6,603.77
7	2	\$7,000	\$6,229.98
8	3	\$7,000	\$5,877.33
9	4	\$5,500	\$4,356.52
10	5	\$5,500	\$4,109.92
11	6	\$4,500	\$3,172.32
12	7	\$10,500	\$6,983.10
13			
14			<b>-\$28,016.90 NPV</b>

Machine should not be purchased.

**4-6**

A \$10,000, 5% bond issued by Holiday Shipping is selling for \$9,500. The bond pays interest annually and matures in ten years. Determine the rate of return for the bond.

**Solution**

	A	B	C	D
1	<b>Bond Rates (IRR)</b>			
2				
3	<b>Year</b>	<b>Income</b>		
4	0	-\$9,500.00		
5	1	\$500.00		
6	2	\$500.00		
7	3	\$500.00		
8	4	\$500.00		
9	5	\$500.00		
10	6	\$500.00		
11	7	\$500.00		
12	8	\$500.00		
13	9	\$500.00		
14	10	\$10,500.00		
15				
16			IRR	5.67%

**4-7**

A machine costing \$35,000 has associated income of \$8,000 the first year with yearly decreases of \$1,000 for the eight year life of the machine. (The 1<sup>st</sup> year = \$8,000, the 2<sup>nd</sup> year \$7,000, etc.) Using Excel determine the payback for the machine.

**Solution**

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Set the MARR to zero. This will negate the time value of money.

		C6 = =NPV(\$D\$2,\$B\$6:B6)+\$C\$5			
	A	B	C	D	E
1	<b>Payback Period</b>				
2			<b>Set MARR</b>	0%	
3					
4	<b>Year</b>	<b>Income</b>	<b>NPV</b>		
5	0	-\$35,000.00	-\$35,000.00		
6	1	\$8,000.00	-\$27,000.00		
7	2	\$7,000.00	-\$20,000.00		
8	3	\$6,000.00	-\$14,000.00		
9	4	\$5,000.00	-\$9,000.00		
10	5	\$4,000.00	-\$5,000.00		
11	6	\$3,000.00	-\$2,000.00		
12	7	\$2,000.00	\$0.00	<b>Payback = 7 years</b>	
13	8	\$1,000.00	\$1,000.00		

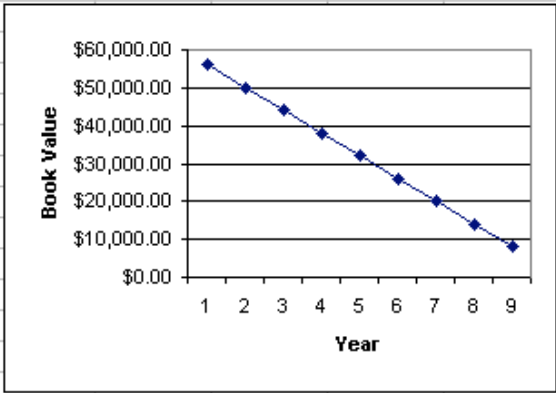
### 4-8

Using Excel, calculate the depreciation per year and the book value each year of an asset costing \$56,000 with a salvage value of \$8,000 at the end of its eight year useful life. Also graph the book value vs. year.

### Solution

C7 = =SLN(C3,C5,C4)

	A	B	C	D	E	F	G	H
1	<b>Straight-line Depreciation</b>							
2								
3		Initial Cost	\$56,000					
4		Useful Life	8					
5		Salvage Value	\$8,000.00					
6								
7	Depreciation per year		\$6,000.00					
8								
9	<b>Year</b>	<b>Book Value</b>						
10	0	\$56,000.00						
11	1	\$50,000.00						
12	2	\$44,000.00						
13	3	\$38,000.00						
14	4	\$32,000.00						
15	5	\$26,000.00						
16	6	\$20,000.00						
17	7	\$14,000.00						
18	8	\$8,000.00						
19								
20								
21								



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