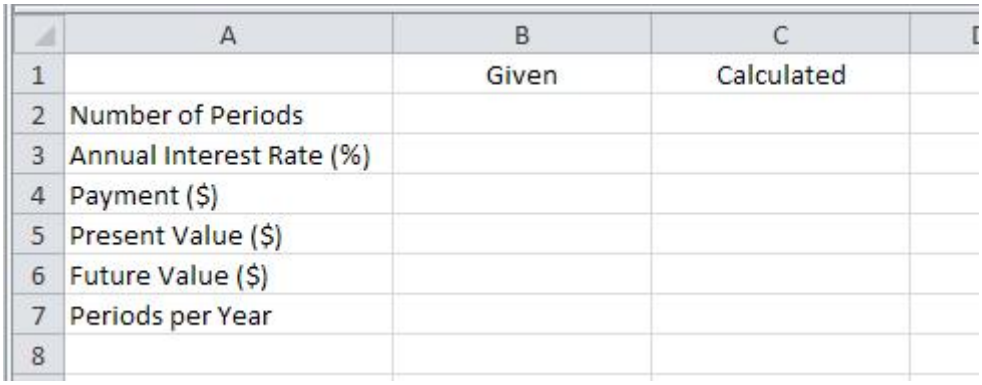
Excel has several built in functions for working with compound interest and annuities. To use these functions, we'll start with a standard Excel worksheet.



	A	B	C
1		Given	Calculated
2	Number of Periods		
3	Annual Interest Rate (%)		
4	Payment ($)		
5	Present Value ($)		
6	Future Value ($)		
7	Periods per Year		
8			

This worksheet contains the variables used throughout Chapter 5. Values given in a problem will be entered in column B. Values calculated by Excel will be entered in column C. We will also assume that amounts paid out are negative and amounts received are positive.

In the different sections of Chapter 5, we'll modify the worksheet shown above. This will allow us to use Excel to calculate the different amounts in the compound interest formula,

$$FV = PV\left(1+i\right)^{n}$$

This is done using two functions in Excel, the FV (future value) function and the PV (present value) function. These functions are very powerful and allow you to compute amounts involving compound interest as well as amounts involving annuities. In an annuity, regular payments are made into or out of an account. In compound interest problems, no regular payments other than interest are made into the account. For this reason, our worksheet above contains an option for including a payment. In Section 5.1, we'll set this amount equal to zero. In later sections, we will consider problems that include payments.

Compound Interest

A customer deposits $\$5000$ in an account that earns 1% annual interest compounded monthly. If the customer makes no further deposits or withdrawals from the account, how much will be in the account in five years?

Solution In a compound interest problem, no regular payments are made into the account. This means that $PMT = 0$. Since the customer deposits $\$5000$ into the account, the present value is entered as a negative number.

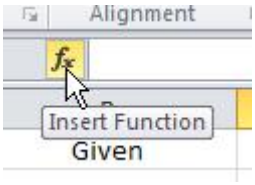
1. Start by creating the worksheet you see below in Excel.

	A	B	C	D
1		Given	Calculated	
2	Number of Periods			
3	Annual Interest Rate (%)			
4	Payment ($)			
5	Present Value ($)			
6	Future Value ($)			
7	Periods per Year			
8				

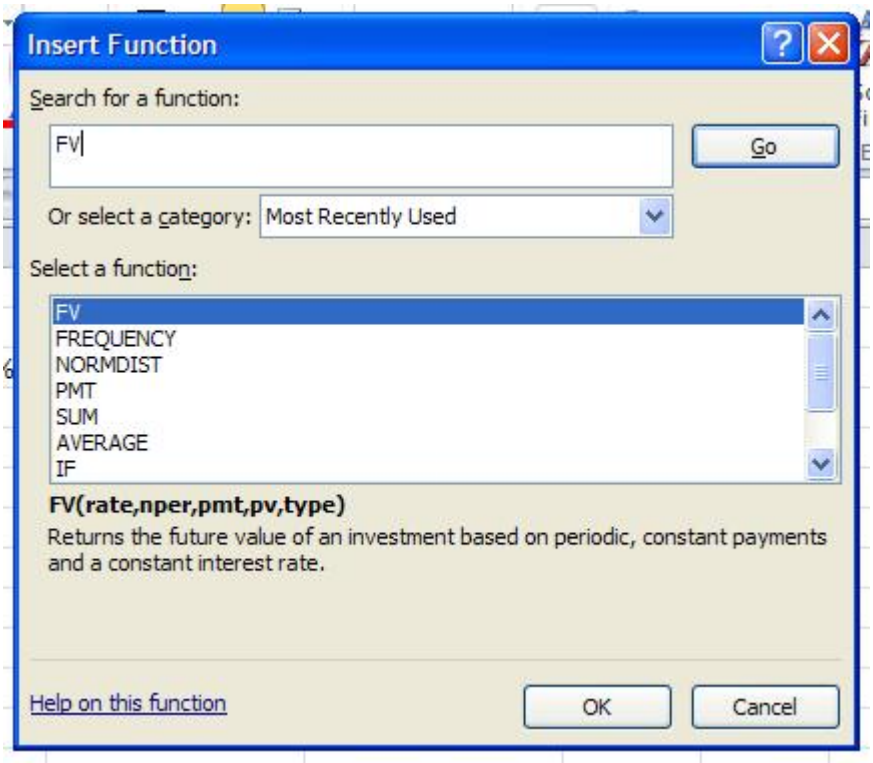
2. Enter the values given in the problem. Make sure you enter the present value as -5000. Leave the future value blank. We will use Excel to calculate the future value in cell C6.

	A	B	C	D
1		Given	Calculated	
2	Number of Periods	60		
3	Annual Interest Rate (%)	1%		
4	Payment ($)	0		
5	Present Value ($)	-5000		
6	Future Value ($)			
7	Periods per Year	12		
8				

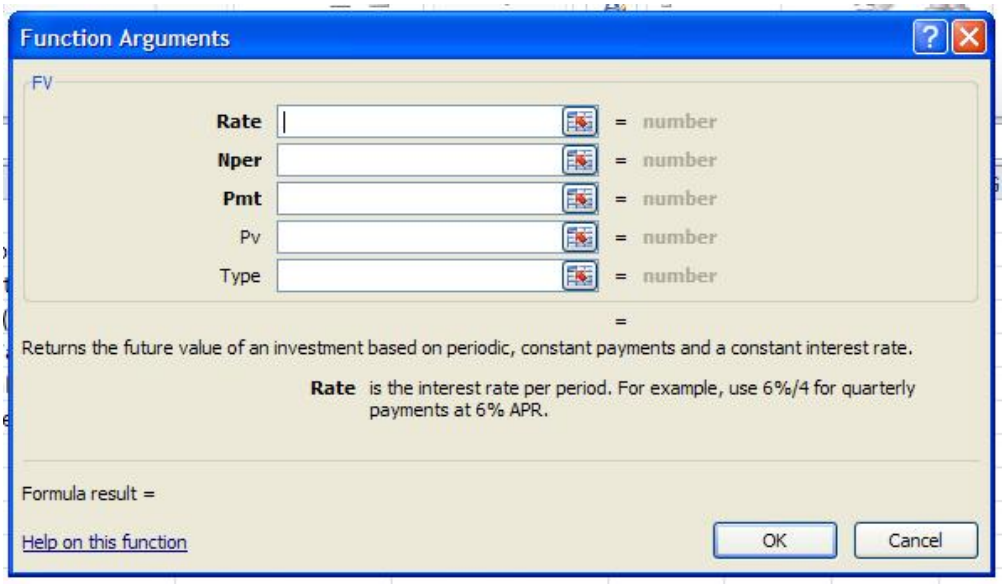
3. Click in cell C6. Now select the Insert Function button along the top of the worksheet.



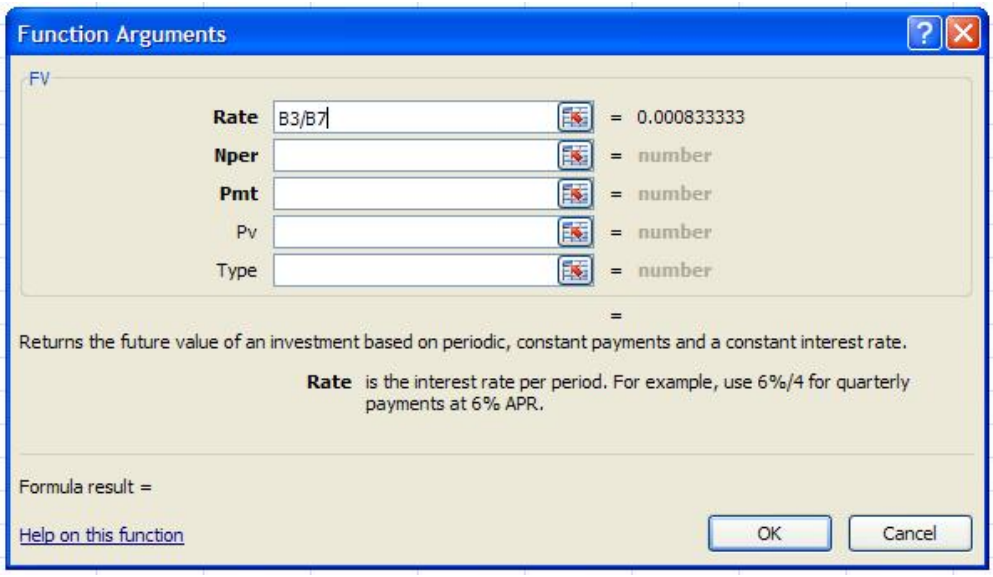
4. In the Insert Function box that appears, search for FV and select Go. From the list that appears under Select a function, choose FV and then click on OK. This starts the FV wizard.



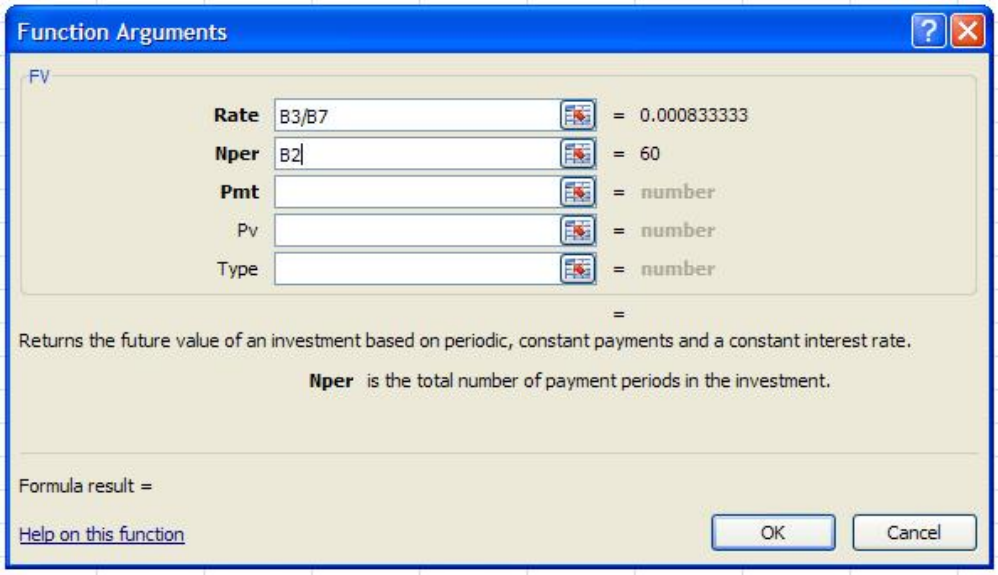
5. The wizard allows you to enter the arguments for the FV function.



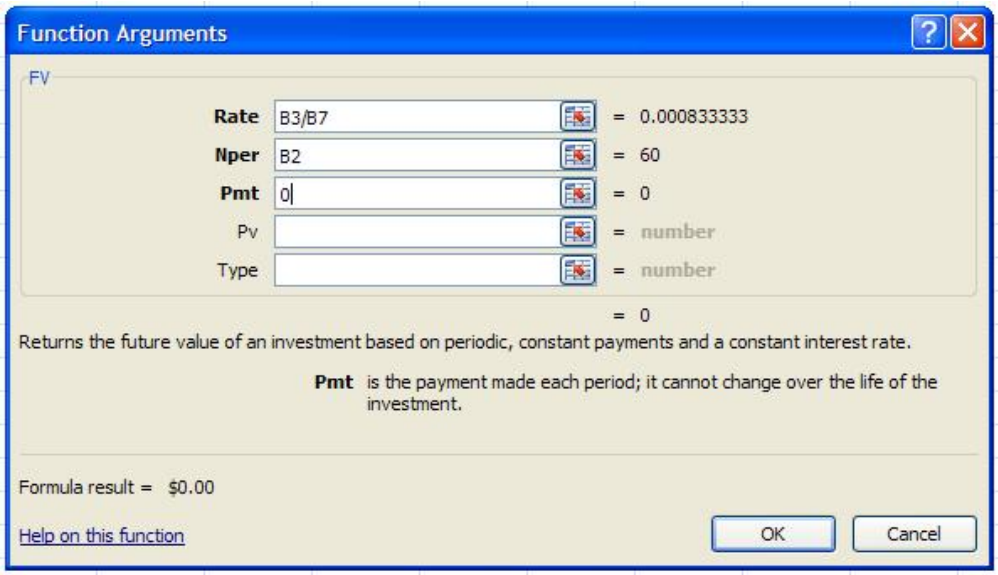
6. In the box next to the rate, we must put the interest rate per period. The annual interest rate is in cell B3 and the number of periods per year is in cell B7. Divide these values in the box next to the rate as shown below. You can also click on those cells to put their locations into the box.



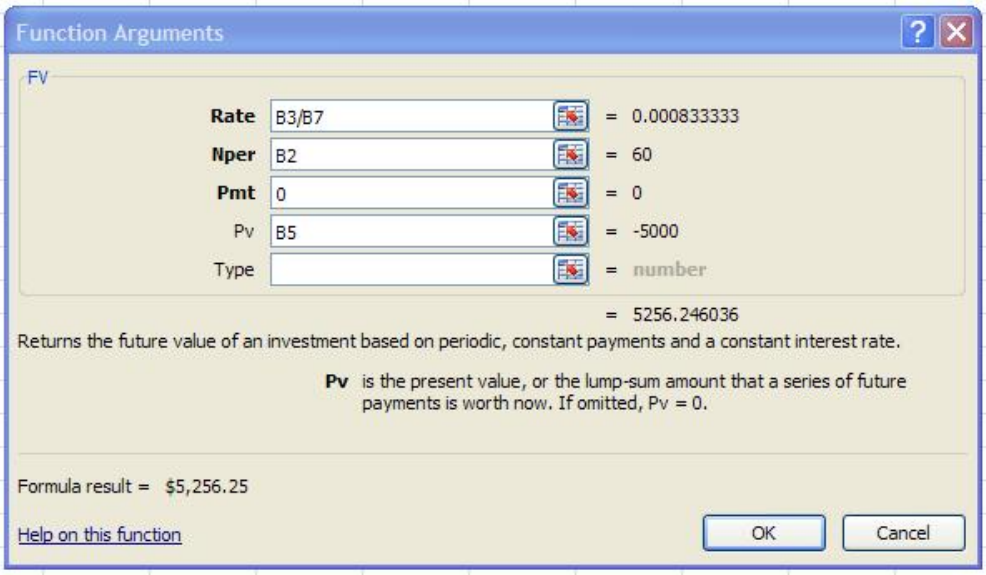
7. Nper is the number of periods. This value is in cell B2.



8. For this compound interest problem, no payments are being made into or out of the account (other than interest). Enter 0 in the box next to Pmt.



9. Pv represents the present value. Since we deposit 5000 into the account initially, enter cell B5 in that box.



For compound interest problems, you can leave the box next to type blank.

10. Click OK to see the future value in cell C6.

	A	B	C
1		Given	Calculated
2	Number of Periods	60	
3	Annual Interest Rate (%)	1%	
4	Payment ($)	0	
5	Present Value ($)	-5000	
6	Future Value ($)		$5,256.25
7	Periods per Year	12	

The future value of $5000 at an interest rate of 1% over 60 monthly periods is $5256.25.

11. You can avoid the FV wizard by entering the FV function with the appropriate arguments shown below.

The format for the FV function is

FV(interest rate per period, number of periods, payment, present value)

For compound interest problems, enter 0 in place of payment.

Present Value

A couple needs $25,000 for a large purchase in five years. How much must be deposited now in an account earning 2% annual interest compounded quarterly to accumulate this amount? Assume no further deposits or withdrawals during this time period.

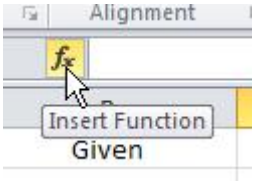
Solution In this problem, the future value is $25,000. We need to find the present value. We'll do this using the present value PV function in Excel.

1. Create an Excel worksheet like the one below.

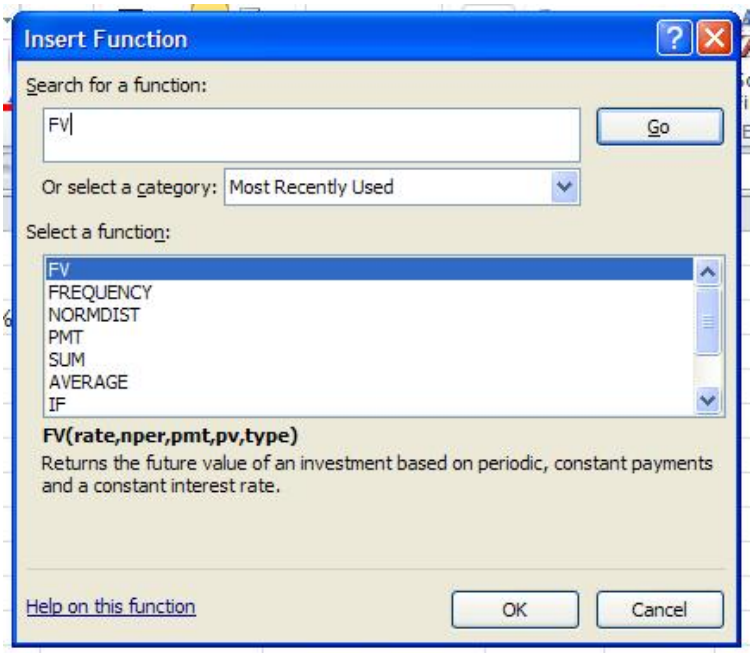
	A	B	C
1		Given	Calculated
2	Number of Periods	20	
3	Annual Interest Rate (%)	2%	
4	Payment ($)	0	
5	Present Value ($)		
6	Future Value ($)	25,000	
7	Periods per Year	4	
8			

Since the future value will be received at the end of five years, enter this value as a positive number.

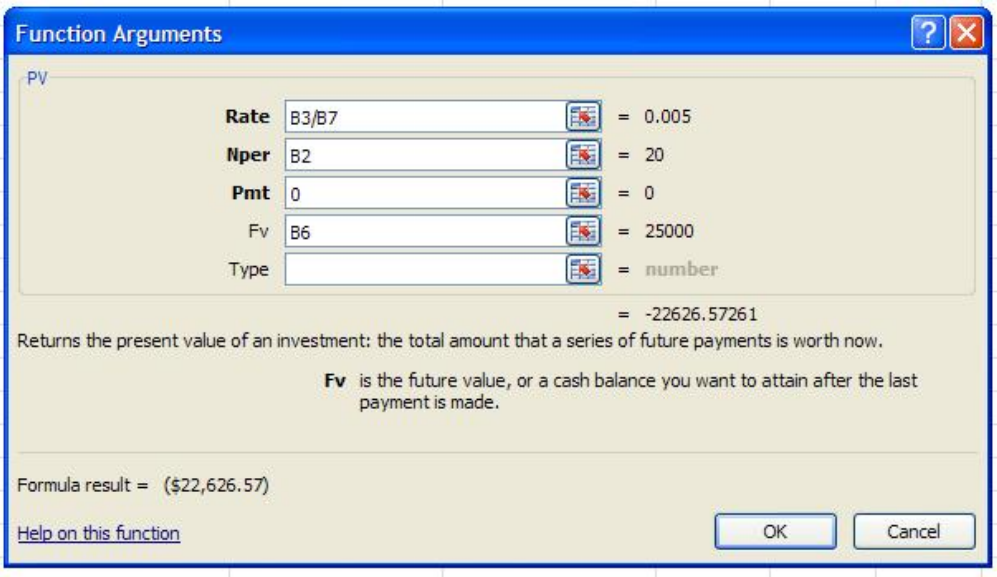
12. Click in cell C6. Now select the Insert Function button along the top of the worksheet.



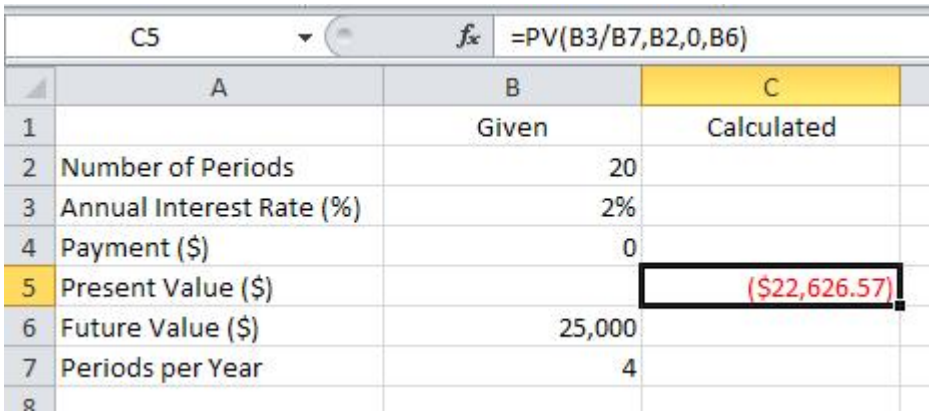
13. In the Insert Function box that appears, search for PV and select Go. From the list that appears under Select a function, choose PV and then click on OK. This starts the PV wizard.



14. The wizard for supplying the function arguments for the PV function starts. In the Rate box, put the interest rate per period, B3/B7. The number of periods Nper is in cell B2. Since no regular payments are made into the account other than interest, put 0 into the Pmt box. Finally, the future value Fv is in cell B6. Enter these values as shown below and select OK.



15. The wizard fills in the arguments for the PV function (see the function bar).



C5 | =PV(B3/B7,B2,0,B6)

	A	B	C
1		Given	Calculated
2	Number of Periods	20	
3	Annual Interest Rate (%)	2%	
4	Payment ($)	0	
5	Present Value ($)		($22,626.57)
6	Future Value ($)	25,000	
7	Periods per Year	4	
8			

The couple would need to deposit $22,626.57 today at an interest rate of 2% compounded quarterly to have $25,000 in five years.

The format for the PV function is

PV(interest rate per period, number of periods, payment, future value)

For compound interest problems, enter 0 in place of payment.