Theme 9. Use of date and time functions in MS Excel. Financial formulas and depreciation of assets

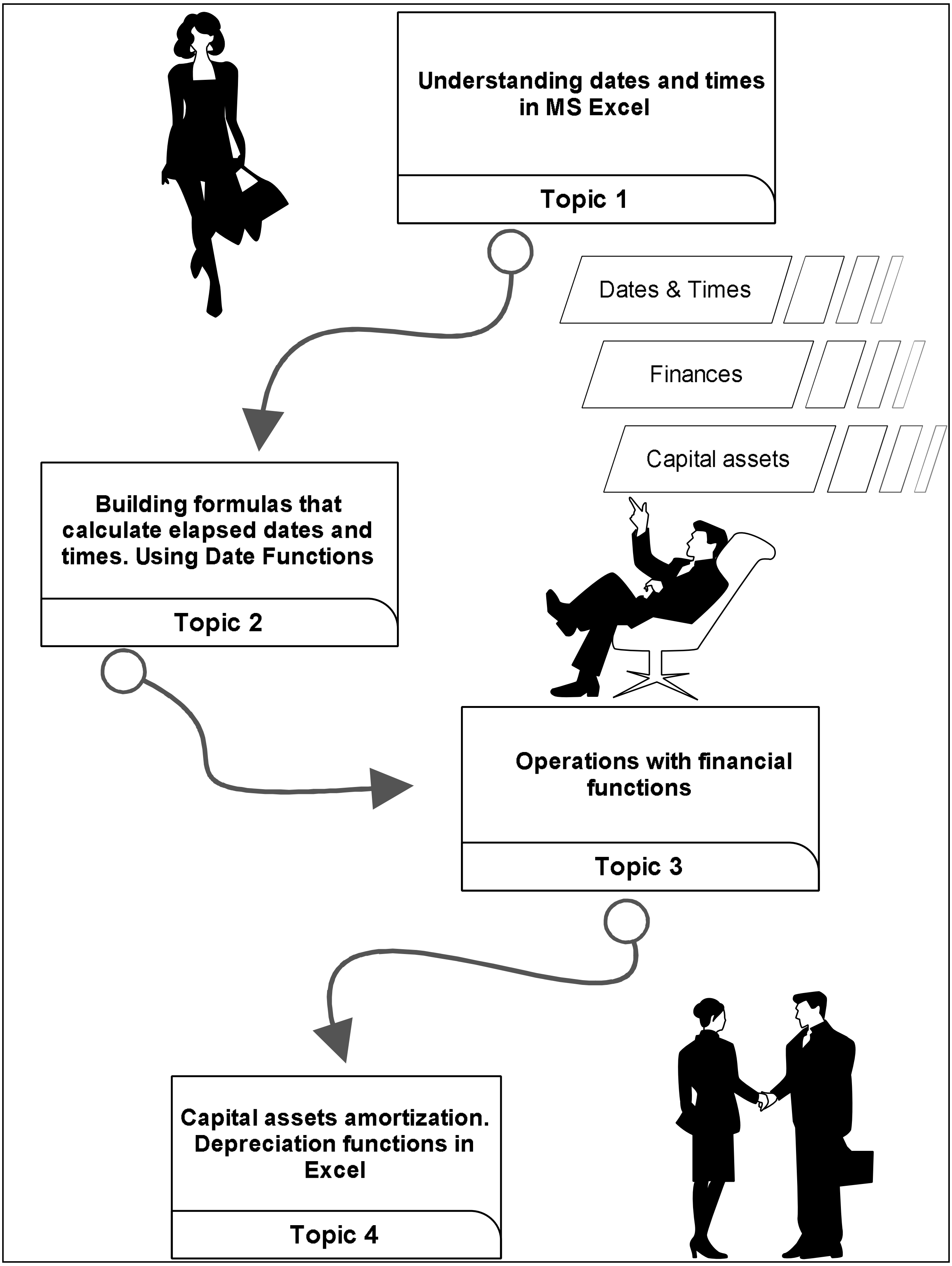


Fig. 9.1. **System elements of the theme**

g Introduction

The purpose of this theme lies in a close study of date and time functions available in MS Office Excel and functions that are used to track financial assets. Basic operations with date and time values are given a thorough consideration both with the calculation of the value of financial assets. Capital assets depreciation methods are analyzed together with the MS Excel functions used to support the overall process.

Clue notions of the theme include: date and time values; future value; present value; incoming cash-flows; outgoing cash-flows; net present value; payments; depreciation methods.

This theme covers the following **topics:** Basic operations with date and time functions. Study of formulas that calculate elapsed dates and times. Basic operations with financial functions. Study of formulas that calculate investment and depreciation of assets.

As a result of the study of the material presented in this theme students will acquire the following **competencies**:

they would understand dates and times in Excel;

they would learn how to use date and time functions;

they would learn how Excel rounds up values;

they would master basic investment functions;

they would study basic depreciation functions.

9.1. Understanding dates and times in MS Excel

Excel doesn't treat the dates and times that you enter in the cells of your worksheet as simple text entries. Any entry with a format that resembles one of the date and time number formats utilized by Excel is automatically converted, behind the scenes, into a serial number.

In the case of dates, this **serial number** represents the **number** of days that have elapsed since the beginning of the twentieth century so that January 1, 1900, is serial number 1; January 2, 1900, is serial number 2; and so forth.

In the case of times, this **serial number** is a **fraction** that represents the number of hours, minutes, and seconds that have elapsed since midnight, which is serial number 0.00000000, so that 12:00:00 p.m. (noon) is serial number 0.50000000; 11:00:00 p.m. is 0.95833333; and so forth.

As long as you format a numeric entry so that it conforms to a recognized date or time format, Excel enters it as a date or time serial number. Only when you enter a formatted date or time as a text entry (by prefacing it with an apostrophe) or import dates and times as text entries into a worksheet do you have to worry about converting them into date and time serial numbers, which enables you to build spreadsheet formulas that perform calculations on them.

9.2. Building formulas that calculate elapsed dates and times. Using Date Functions

Most of the date formulas that you build are designed to calculate the number of days or years that have elapsed between two dates. To do this, you build a simple formula that subtracts the later date from the earlier date. For example, if you input the date 4/25/75 in cell B11 and 6/3/04 in cell C11 and you want to calculate the number of days that have elapsed between April 25, 1975, and June 3, 2004, in cell D11, you would enter the following subtraction formula in that cell: =C11-B11

Excel then inputs the number of days between these dates in cell D5. The only problem is that the program will also apply the **Date format** used by these two dates so that the result in cell D5 appears as the date: 2/8/1929.

To display this result as a whole number, as you'd expect, you still have to format the result with another number format. If, for example, you apply the General number format to the cell D5 (you can do this quickly by pressing Ctrl+Shift+` or Ctrl+~), the calculated result in this cell becomes the much more sensible number of days: 10632.

If you want the result between two dates expressed in the number of years rather than the number of days, divide the result of your subtraction by the number of days in a year. In this example, you can enter the formula =D11/365 in cell Ell to return the result 29.12877, which you can then round off to 29 by clicking the **Decrease Decimal** button in the **Number group** on the **Home tab** of the **Ribbon** or by pressing Alt+H9 until only 29 remains displayed in the cell.

Some spreadsheets require that formulas calculate the amount of elapsed time between a **starting** and **ending** time. To build a formula that calculates how much time has elapsed between two different times of the day, subtract the ending time of day from the starting time of day. For example, suppose that you enter a person's starting time in cell B14 and ending time in CI4. In cell D14, you would enter the following subtraction formula: =C14-B14.

Excel then returns the difference in cell D14 as a decimal value representing what fraction that difference represents of an entire day (that is, a 24-hour period). If, for example, cell B14 contains a starting time of 9:15 a.m. and cell C14 contains an ending time of 3:45 p.m., Excel returns the following decimal value to cell D14: 6:30 AM.

To convert this time of day into its equivalent decimal number, you convert the time format automatically given to it to the General format (Ctrl+Shift+` or Ctrl+~), which displays the following result in cell D14: 0.270833.

To convert this decimal number representing the fraction of an entire day into the number of hours that have elapsed, you simply multiply this result by 24 as in =D14*24, which gives you a result of 6.5 hours when you apply the General format (Ctrl+Shift+` or Ctrl+~) to it.

Using Date Functions. Excel contains a number of built-in date functions that you can use in your spreadsheets.

The easiest date function has to be TODAY. This function takes no arguments and is always entered as follows: =TODAY()

When you enter the TODAY function in a cell by clicking it on the **Date & Time** command button's drop-down list on the Ribbon's **Formulas** tab or by typing it, Excel returns the current date by using the following Date format: 7/23/2008

Keep in mind that the date inserted into a cell with the TODAY function is not static. Whenever you open a worksheet that contains this function, Excel recalculates the function and updates its contents to the current date. This means that you don't usually use TODAY to input the current date when you're doing it for historical purposes (an invoice, for example) and never want it to change.

The DATE function on the **Date & Time** command button's drop-down menu returns a date serial number for the date specified by the year, month, and day argument. This function uses the following syntax: DATE (year, month, day) (fig. 9.2).

This function comes in handy when you have a worksheet that contains the different parts of the date in separate columns, similar to the one shown in Figure 1. You can use it to combine the three columns of date information into a single date cell that you can use in sorting and filtering.

The DATEVALUE function on the Date & Time button's drop-down menu returns the date serial number for a date that's been entered into the spreadsheet as text so that you can use it in date calculations. This function takes a single argument: DATEVALUE (date_text).

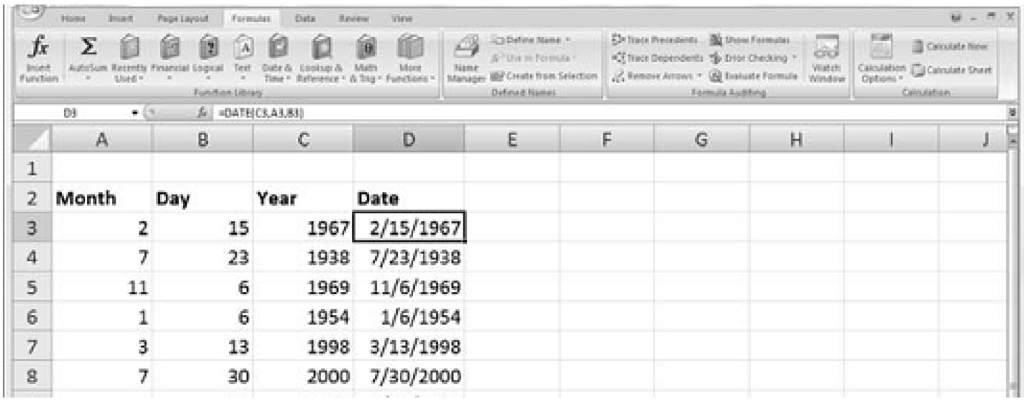


Fig. 9.2. **Using the DATE function to combine separate date information into a single entry**

The DAY, WEEKDAY and MONTH date functions on the **Date & Time** command button's drop-down menu all return just parts of the date serial number that you specify as their argument:

DAY(serial_number or date) to return the day of the month in the date (as a number between 1 and 31);

WEEKDAY(serial_number or date,[return_type]) to return the day of the week (as a number between 1 and 7 or 0 and 6). The optional return_type argument is a number between 1 and 3; 1 (or no return_type argument) specifies the first type where 1 equals Sunday and 7 equals Saturday; 2 specifies the second type where 1 equals Monday and 7 equals Sunday; and 3 specifies the third type where 0 equals Monday and 6 equals Sunday;

MONTH(serial_number or date to return the number of the month in the date serial number (from 1 to 12).

For example, if you enter the following DAY function in a cell as follows: DAY(DATE (08,4,15)) or just DAY(E4), where E4 contains date, Excel returns the value 15 to that cell. If, instead, you use the WEEKDAY function as follows: WEEKDAY(DATE(08,4,15)), Excel returns the value 4, which represents Wednesday (using the first return_type where Sunday is 1 and Saturday is 7) because the optional return_type argument isn't specified. If you use the MONTH function on this date as in the following: MONTH(DATE (08 ,4, 15), Excel returns 4 to the cell. Don't use these functions on dates entered as text entries. Always use the DATE/VALUE function to convert these text dates and then use the DAY, WEEKDAY, MONTH functions on the serial numbers returned by the DATE/VALUE function to ensure accurate results.

9.3. Operations with financial functions

The key to using any of Excel's financial functions is to understand the terminology used by their arguments. Many of the most common financial functions, such as PV (Present Value), NPV (Net Present Value), FV (Future Value), and PMT (Payment), take similar arguments:

PV (present value of an investment) is the present value that is the principal amount of the annuity;

FV (future value of an investment) is the future value that represents the principal plus interest on the annuity;

PMT (payment for a loan) is the payment made each period in the annuity. Normally, the payment is set over the life of the annuity and includes principal plus interest without any other fees;

RATE is the interest rate per period. Normally, the rate is expressed as an annual percentage;

NPER (number of periods for an investment) is the total number of payment periods in the life of the annuity. You calculate this number by taking the Term (the amount of time that interest is paid) and multiplying it by the Period (the point in time when interest is paid or earned) so that a loan with a three-year term with 12 monthly interest payments has 3 x 12, or 36 payment periods.

When using financial functions, keep in mind that the **fv, pv**, and **pmt** arguments can be positive or negative, depending on whether you're receiving the money (as in the case of an investment) or paying out the money (as in the case of a loan). Also keep in mind that you have to express the rate argument in the same units as the **nper** argument, so that if you make monthly payments on a loan and you express the **nper** as the total number of monthly payments, as in 360 (30 x 12) for a 30-year mortgage, you need to express the annual interest rate in monthly terms as well. For example, if you pay an annual interest rate of 7.5 percent on the loan, you express the rate argument as 0.075/12 so that it is monthly as well.

The NPV, PV and FV functions

& ***Net present value*** *is an economic standard method for evaluating competing long-term projects. It is defined as the total present value (PV) of a time series of cash flows. It is a standard method for using the time value of money to appraise long-term projects.*

Each cash inflow/outflow is discounted back to its present value (PV). Then they are summed. Therefore NPV is the sum of all terms (9.1):

$$\frac{R_t}{(1+i)^t} \quad (9.1), \text{ where}$$

t - the time of the cash flow;

i - the discount rate (the rate of return that could be earned on an investment in the financial markets with similar risk;

R_t - the net cash flow (the amount of cash, inflow minus outflow) at time *t* (for educational purposes, R_0 is commonly placed to the left of the sum to emphasize its role as (minus the) investment).

& ***The discount rate** is the rate used to discount future cash flows to their present values is a key variable of this process.*

A widespread approach to choosing the discount rate factor is to decide the rate which the capital needed for the project could return if invested in an alternative venture. If, for example, the capital required for Project A can earn five percent elsewhere, use this discount rate in the NPV calculation to allow a direct comparison to be made between Project A and the alternative.

NPV is an indicator of how much value an investment or project adds to the firm. With a particular project, if Ct is a positive value, the project is in the status of discounted cash inflow in the time of t. If Ct is a negative value, the project is in the status of discounted cash outflow in the time of t. Appropriately risked projects with a positive NPV could be accepted.

In financial theory, if there is a choice between two mutually exclusive alternatives, the one yielding the higher NPV should be selected. The following sums up the NPVs in various situations (table 9.1).

Table 9.1

NPV value ranges

If...	It means...	Then...
NPV > 0	the investment would add value to the firm	the project may be accepted
NPV < 0	the investment would subtract value from the firm	the project should be rejected
NPV = 0	the investment would neither gain nor lose value for the firm	Decision should be based on other criteria, e.g. strategic positioning or other factors.

Example. A corporation must decide whether to introduce a new product line. The new product will have startup costs, operational costs, and incoming cash flows over six years. This project will have an immediate (t=0) cash outflow of $100,000 (which might include machinery, and employee training costs). Other cash outflows for years 1 – 6 are expected to be $5,000 per year. Cash inflows are expected to be $30,000 each for years 1 – 6. All cash flows are after-tax, and there are no cash flows expected after year 6. The required rate of return is 10%. The present value (PV) can be calculated for each year:

Year	Cashflow	Present Value
T=0	$\frac{-100,000}{(1+0.10)^0}$	-$100,000
T=1	$\frac{30,000-5,000}{(1+0.10)^1}$	$22,727
T=2	$\frac{30,000-5,000}{(1+0.10)^2}$	$20,661
T=3	$\frac{30,000-5,000}{(1+0.10)^3}$	$18,783
T=4	$\frac{30,000-5,000}{(1+0.10)^4}$	$17,075
T=5	$\frac{30,000-5,000}{(1+0.10)^5}$	$15,523
T=6	$\frac{30,000-5,000}{(1+0.10)^6}$	$14,112

The sum of all these present values is the net present value, which equals $8,881.52. Since the NPV is greater than zero, it would be better to invest in the project than to do nothing, and the corporation should invest in this project if there is no alternative with a higher NPV.

The PV (Present Value), NPV (Net Present Value), and FV (Future Value) functions all found on the **Financial button's** drop-down menu on the **Ribbon's Formulas tab** (Alt+MI) enable you to determine the profitability of an investment.

The PV, or **Present Value**, function returns the present value of an investment, which is the total amount that a series of future payments is worth presently. The syntax of the PV function is as follows: =PV(rate,nper,pmt,[fv],[type])

The **fv** and **type** arguments are optional arguments in the function (indicated by the square brackets). The fv argument is the future value or cash balance that you want to have after making your last payment. If you omit the fv argument, Excel assumes a future value of zero (0). The type argument indicates whether the payment is made at the beginning or end of the period: Enter 0 (or omit the type argument) when the payment is made at the end of the period and use 1 when it is made at the beginning of the period.

Figure 9.3 contains several examples using the PV function. All three PV functions use the same annual percentage rate of 7.25 percent and term of 10 years. Because payments are made monthly, each function converts these annual figures into monthly ones.

For example, in the PV function in cell E3, the annual interest rate in cell A3 is converted into a monthly rate by dividing by 12 (A3/12) and the annual term in cell B3 is converted into equivalent monthly periods by multiplying by 12 (B3 x 12).

E3 =PV(A3/12,B3*12,C3)

	A	B	C	D	E	F
1						
2	**Annual Interest Rate**	**Term in years**	**Payment**	**Future Value**	**Present Value**	**Formula**
3	7.25%	10	($218.46)		$18,608.01	=PV(A3/12,B3*12,C3)
4						
5	7.25%	10	($218.46)		$18,607.53	=PV(A5/12,B5*12,C5,1)
6						
7	7.25%	10		$8,000.00	($3,883.06)	=PV(A7/12,B7*12,,D7)

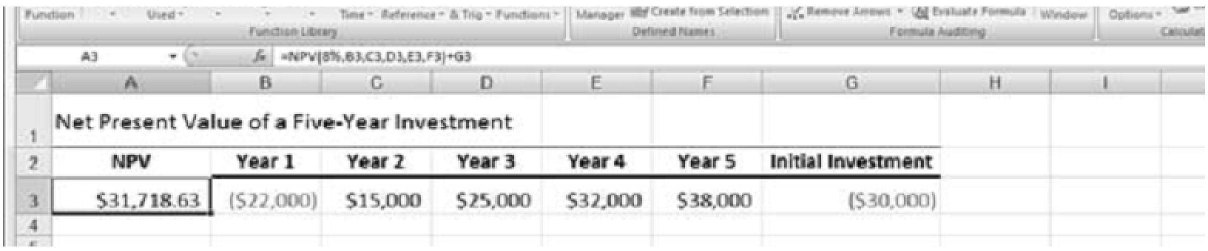
Fig. 9.3. **Using the PV function to calculate the present value of various investments**

Note that although the PV functions in cells E3 and E5 use the rate, nper, and pmt ($218.46) arguments, their results are slightly different. This is caused by the difference in the type argument in the two functions: the PV function in cell E3 assumes that each payment is made at the end of the period (the type argument is 0 whenever it is omitted), while the PV function in cell E5 assumes that each payment is made at the beginning of the period (indicated by a type argument of 1).When the payment is made at the beginning of the period, the present value of this investment is $0.49 higher than when the payment is made at the end of the period, reflecting the interest accrued during the last period.

The third example in cell E7 (shown in fig. 9.3) uses the PV function with an **fv** argument instead of the **pmt** argument. In this example, the PV function states that you would have to make monthly payments of $3,883.06 for a 10-year period to realize a cash balance of $8,000, assuming that the investment returned a constant annual interest rate of 71/4 percent. Note that when you use the PV function with the fv argument instead of the pmt argument, you must still indicate the position of the pmt argument in the function with a comma (thus the two commas in a row in the function) so that Excel doesn't mistake your fv argument for the pmt argument.

The NPV function calculates the net present value based on a series of cash flows. The syntax of this function is: =NPV(rate,valuel,[value2],[...]), where value 1, value 2, and so on are between 1 and 13 value arguments representing a series of payments (negative values) and income (positive values), each of which is equally spaced in time and occurs at the end of the period. The NPV investment begins one period before the period of the value 1 cash flow and ends with the last cash flow in the argument list. If your first cash flow occurs at the beginning of the period, you must add it to the result of the NPV function rather than include it as one of the arguments.

Figure 9.4 illustrates the use of the NPV function to evaluate the attractiveness of a five-year investment that requires an initial investment of $30,000 (the value in cell G3). The first year, you expect a loss of $22,000 (cell B3); the second year, a profit of $15,000 (cell C3); the third year, a profit of $25,000 (cell D3); the fourth year, a profit of $32,000 (cell E3); and the fifth year, a profit of $38,000 (cell F3). Note that these cell references are used as the value arguments of the NPV function.



NPV	Year 1	Year 2	Year 3	Year 4	Year 5	Initial Investment
$31,718.63	($22,000)	$15,000	$25,000	$32,000	$38,000	($30,000)

Fig. 9.4. **Using the NPV function to calculate the net present value of an investment.**

Unlike when using the PV function, the NPV function doesn't require an even stream of cash flows. The rate argument in the function is set at 8 percent. In this example, this represents the discount rate of the investment; that is, the interest rate that you may expect to get during the five-year period if you put your money into some other type of investment, such as a highyield money-market account. This NPV function in cell A3 returns a net present value of $31,718.63, indicating that you can expect to realize about $1,719 more from investing your $30,000 in this investment than you would from investing the money in a money-market account at an interest rate of 8 percent.

The **FV, Future value,** function calculates the future value of an investment. The syntax of this function is: =FV(rate,nper,pmt, [pv] , [type]).

The rate, nper, pmt, and type arguments are the same as those used by the PV function. The pv argument is the present value or lump-sum amount for which you want to calculate the future value. As with the fv and type arguments in the PV function, both the pv and type arguments are optional in the FV function. If you omit these arguments, Excel assumes their values to be zero (0) in the function.

You can use the FV function to calculate the future value of an investment, such as an IRA (Individual Retirement Account). For example, suppose that you establish an IRA at age 43 and will retire 22 years hence at age 65 and that you plan to make annual payments into the IRA at the beginning of each year. If you assume a rate of return of 8.5 percent a year, you would enter the following FV function in your worksheet: =FV(8.5%,22,-1000, ,1).

Excel then indicates that you can expect a future value of $64,053.66 for your IRA when you retire at age 65. If you had established the IRA a year prior and the account already has a present value of $1,085, you would amend the FV function as follows: =FV(8.5%,22,-1000,-1085,1).

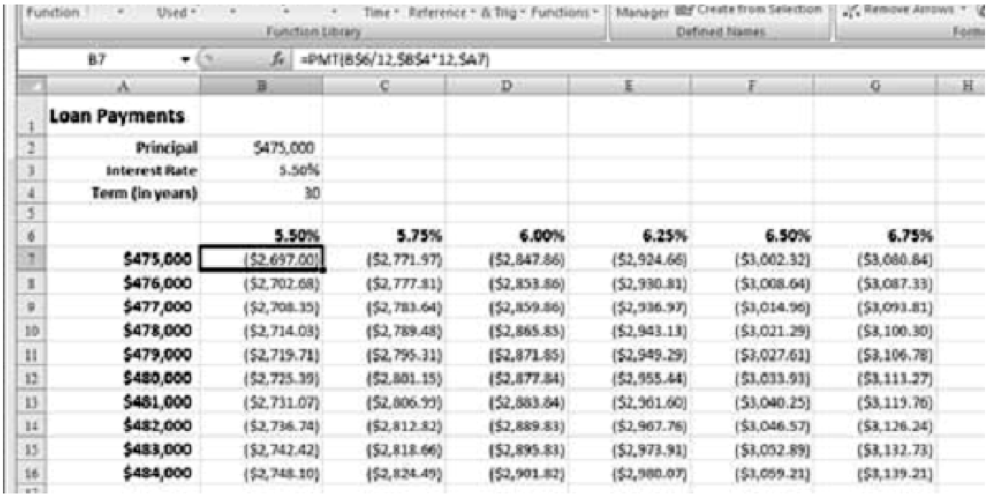
In this case, Excel indicates that you can expect a future value of $70,583.22 for your IRA at retirement.

The PMT function. The PMT function calculates the periodic payment for an annuity, assuming a stream of **equal** payments and a constant rate of interest. It’s situated on the Financial button's drop-down menu on the Formulas tab of the Ribbon. The PMT function uses the following syntax: =PMT(rate,nper,pv,[fv],[type]).

As with the other common financial functions, **rate** is the interest rate per period, **nper** is the number of periods, **pv** is the present value or the amount the future payments are worth presently, **fv** is the future value or cash balance that you want after the last payment is made.

Excel assumes a future value of **zero** when you omit this optional argument as you would when calculating loan payments, and **type** is the value 0 for payments made at the end of the period or the value 1 for payments made at the beginning of the period (if you omit the optional type argument, Excel assumes that the payment is made at the end of the period).

The PMT function is often used to calculate the payment for mortgage loans that have a fixed rate of interest. Figure 9.5 shows you a sample worksheet that contains a table using the PMT function to calculate loan payments for a range of interest rates (from 5 percent to 6.75 percent) and principals ($350,000 to $359,000).



	A	B	C	D	E	F	G
1	**Loan Payments**						
2	Principal	$475,000					
3	Interest Rate	5.50%					
4	Term (in years)	30					
5							
6		5.50%	5.75%	6.00%	6.25%	6.50%	6.75%
7	$475,000	($2,697.00)	($2,771.97)	($2,847.66)	($2,924.66)	($3,002.32)	($3,080.84)
8	$476,000	($2,702.68)	($2,777.81)	($2,853.86)	($2,930.81)	($3,008.64)	($3,087.33)
9	$477,000	($2,708.35)	($2,783.64)	($2,859.86)	($2,936.97)	($3,014.96)	($3,093.81)
10	$478,000	($2,714.03)	($2,789.48)	($2,865.85)	($2,943.13)	($3,021.29)	($3,100.30)
11	$479,000	($2,719.71)	($2,795.31)	($2,871.85)	($2,949.29)	($3,027.61)	($3,106.78)
12	$480,000	($2,725.39)	($2,801.15)	($2,877.84)	($2,955.44)	($3,033.93)	($3,113.27)
13	$481,000	($2,731.07)	($2,806.99)	($2,883.84)	($2,961.60)	($3,040.25)	($3,119.76)
14	$482,000	($2,736.74)	($2,812.82)	($2,889.83)	($2,967.76)	($3,046.57)	($3,126.24)
15	$483,000	($2,742.42)	($2,818.66)	($2,895.83)	($2,973.91)	($3,052.89)	($3,132.73)
16	$484,000	($2,748.10)	($2,824.49)	($2,901.82)	($2,980.07)	($3,059.21)	($3,139.21)

Fig. 9.5. **Loan Payments table using the PMT function to calculate various loan payments.**

The table uses the initial principal that you enter in cell B2, copies it to cell A7, and then increases it by $1,000 in the range A8:A16. The table uses the initial interest rate that you enter in cell B3, copies to cell B6, and then increases this initial rate by 1/4 of a percent in the range C6:G6. The term in years in cell B4 is a constant factor that is used in the entire loan payment table.

9.4. Capital assets amortization. Depreciation functions in Excel

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& *In economics and accounting,* ***depreciation*** *is seen as the change in the market value of capital over a given period of time.It is calculated as the market price of the capital at the beginning of the period minus its market price at the end of the period. The similar concept for intangible assets is called* ***amortization****.*

For natural resources like minerals and oil the similar concept is called ***depletion****.*

Excel lets you choose from four different **Depreciation functions**, each of which uses a slightly different method for depreciating an asset over time. These built-in Depreciation functions found on the Financial button's dropdown menu on the Formulas tab of the Ribbon include the following:

SLN (cost,salvage,life) to calculate straight-line depreciation. This function returns the straight-line depreciation of an asset for one period. It’s the simplest and most often used technique, in which the company estimates the "salvage value" of the asset after the length of time over which it is depreciated, and assumes the drop in the asset's value is spread **evenly in equal**, **yearly** increments over that amount of time. The salvage value is an estimate of the value of the asset at the time it will be sold or disposed of;

SYD (cost, salvage, life, per) to calculate sum-of-years’ digits depreciation of an asset for a specified period. It`s an accelerated schedule that adds up the digits for the remaining years of the useful life. An asset with three years of remaining useful life would add up 3 + 2 + 1 =6. The depreciation schedule is then 3/6th for the first year, 2/6th for the second and 1/6th for the 3rd year, assuming no remaining value;

DB (cost,salvage,life,period,[month]) to calculate declining balance depreciation. This function returns the depreciation of an asset for a specified period using the fixed-declining balance method;

DDB (cost,salvage,life,period,[factor]) to calculate double-declining balance depreciation. This function returns the depreciation of an asset for a specified period using the double-declining balance method or some other method you specify.

As you can see, with the exception of the optional month argument in the **DB** function and the optional factor argument in the **DDB** function, all the Depreciation functions require the cost, salvage, and life arguments, and all but the **SLN** function require a period argument as well:

Cost is the initial cost of the asset that you're depreciating;

Salvage is the value of the asset at the end of the depreciation (also known as the salvage value of the asset);

Life is the number of periods over which the asset is depreciating (also known as the useful life of the asset);

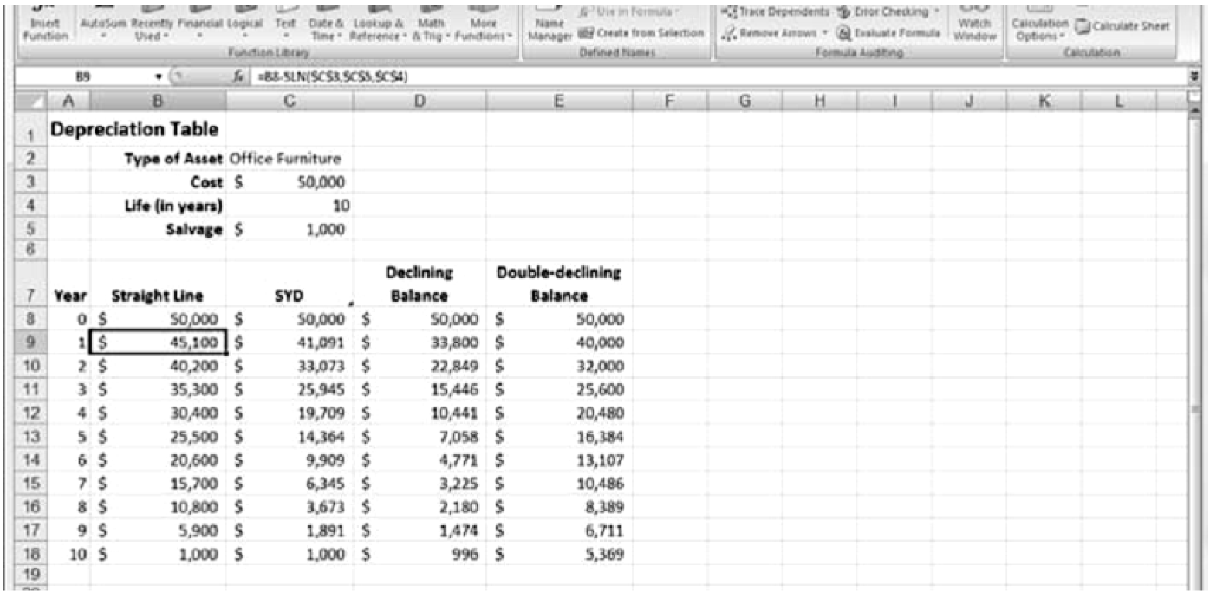
Per or Period is the period over which the asset is being depreciated. The units that you use in the period argument must be the same as those used in the life argument of the Depreciation function so that if you express the life argument in years, you must also express the period argument in years.

Note that the DB function accepts an optional month argument. This argument is the number of months that the asset is in use in the first year. If you omit the month argument from your DB function, Excel assumes the number of months of service to be 12.

When using the DDB function to calculate the double-declining balance method of depreciation, you can add an optional factor argument. This argument is the rate at which the balance declines in the depreciation schedule. If you omit this optional factor argument, Excel assumes the rate to be 2 (thus, the name double-declining balance).

Figure 6 contains a Depreciation table that uses all four depreciation methods to calculate the depreciation of office furniture originally costing $50,000 to be depreciated over a 10-year period, assuming a salvage value of $1,000 at the end of this depreciation period.

The Formula bar shown in Figure 9.6 shows the SLN formula that is entered into cell B9: =B8-SLN(B3,B5,B4).



Depreciation Table

Type of Asset	Office Furniture
Cost	$ 50,000
Life (in years)	10
Salvage	$ 1,000

Year	Straight Line	SYD	Declining Balance	Double-declining Balance
0	$ 50,000	$ 50,000	$ 50,000	$ 50,000
1	$ 45,100	$ 41,091	$ 33,800	$ 40,000
2	$ 40,200	$ 33,073	$ 22,849	$ 32,000
3	$ 35,300	$ 25,945	$ 15,446	$ 25,600
4	$ 30,400	$ 19,709	$ 10,441	$ 20,480
5	$ 25,500	$ 14,364	$ 7,058	$ 16,384
6	$ 20,600	$ 9,909	$ 4,771	$ 13,107
7	$ 15,700	$ 6,345	$ 3,225	$ 10,486
8	$ 10,800	$ 3,673	$ 2,180	$ 8,389
9	$ 5,900	$ 1,891	$ 1,474	$ 6,711
10	$ 1,000	$ 1,000	$ 996	$ 5,369

Fig. 9.6. **Depreciation Table showing 10-year depreciation of an asset using various methods.**

This formula subtracts the amount of straight-line depreciation to be taken in the first year of service from the original cost of $50,000 (this value is brought forward from cell B3 by the formula =B3). After creating this original formula in cell B9, then the Fill handle was used to copy it down to cell B18, which contains the final salvage value of the asset in the 10th year of service.

Cell C9 contains a similar formula for calculating the sum-of-years-digits depreciation for the office furniture. This cell contains the following formula: =C8-SYD(B3,B5,B4,$A9).

This formula subtracts the amount of sum-of-years-digits depreciation to be taken at the end of the first year from the original cost of $50,000 in cell C8 (also brought forward from cell B3 by the formula =B3).

After creating this original formula in cell C9, again Fill handle was used the to copy it down to cell C18, which also contains the final salvage value of the asset in the 10th year of service.

The same basic procedure was used to create the formulas using the **DB** and **DDB** depreciation methods in the cell ranges D8:D18 and E8:E18, respectively.

Note that, like the SYD function, both of these depreciation functions require the use of a period argument, which is supplied by the list of years in the cell range A9:A18.

Note also, that the values in cell B4, which supplies the life argument to the SYD, DB, and DDB functions, matches the year units used in this cell range.

s **Questions**

1. How does MS Excel interpret date and time values?
2. What are main date functions?
3. Which date function is responsible for filling-in the current date?
4. For what purpose PV and FV functions are used?
5. What economic method is supported by NPV function?
6. What is depreciation of assets? What functions are used to calculate depreciation?
7. What is the difference between straight-line depreciation method and other depreciation methods?

@**Tests**

1. Which function is used to appraise competing long-term project?	a) PV b) FV c) PFV d) NPV

2. A cash flow is...	a) a sum of money on a given period of time b) money received as a result of transactions c) bank interest rate d) ingoing or outgoing amount of financial assets for a given period of time
3. Present value is a function that calculates the value of money	a) for the present period of time b) that took part in preceding transactions c) that was taken from a bank in the form of a loan d) on a given date in the future
4. The operation of evaluating the future value of money into the present value is called:	a) privatization b) capitalization c) depreciation d) discounting
5. In order for the project to be competitive NPV should be	a) more than 0 b) less than zero c) equal to zero d) equal to 1
6. The PMT function is used to calculate	a) the amount of payment for each period in the annuity b) the payment for the whole of the annuity c) the payment for the future period d) the first payment in the annuity
7. Depreciation is considered to be	a) a change of the value of money over time b) an increase of the value of money c) a decrease of the value of money d) a method of calculating the future value of money
8. Which function uses straight-line depreciation of assets?	a) SLN b) SYD c) DB d) DDB
9. Salvage is the value of an asset...	a) at the end of depreciation b) at the beginning of depreciation c) the net value of an asset d) in the middle of depreciation