

PROcalc™

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Registering PROcalc

Introduction

PROcalc for Windows (3.1) is an easy to use, powerful personal add listing machine and financial calculator. The system provides a full financial and business calculating capability which is constantly available to you no matter what application you are running. Using PROcalc you can calculate annuities, percentages, compound and simple interest, sinking fund, loan repayments, etc., and transfer the results back to the application you are currently running. You can also pass information from your current application to PROcalc, obviating the need to re-enter the figures which are to be the subject of your calculations.

Features and functions

- On-screen display of the add list tally roll, with the facility to:
 - Name tally roll for ease of identification
 - Print tally roll
 - Save to disk
 - Load saved lists for review/print
 - Scroll through the last 1,000 entries
 - Undo entries back to the last total
 - Transfer tally roll to the clipboard
- On-screen display of memories and registers
- Small calculator display option providing add listing and a reduced set of functions
- Mathematical functions include:
 - Arithmetic (+, -, x, /)
 - Square and square-root
 - Universal powers
 - Universal roots
 - Percentage
 - Percentage uplift, reduction and profit margin calculations
- Financial capabilities to help solve problems involving:
 - Simple interest
 - Compound interest
 - Mortgages
 - Savings accounts
 - Installment loans
 - Insurance plans
 - Annuities
 - Bond yields
 - Bond analysis (discounting)
 - Depreciation
 - Calculation of APR

Arrears and advance modes for ordinary and annuities due calculations
- Constant capability on all four arithmetic functions
- Full function memory
- Fixed or floating decimal places
- Paste a series of calculations from another application
- Up to 5 named user definable macros (up to 30 key strokes) for such things as VAT calculation, gross up, extract from gross etc.
- User configurable fonts, display colours and backgrounds.
- Bitmap or colour calculator background.

- Keep on top option to allow you to always have PROcalc available for use
- Accurate to twelve significant digits.

Installation

An automated installation routine is provided on the issue disk. To run this routine insert the issue disk in your floppy drive, launch Windows and select File from the Program Manager menu bar, followed by Run..., and enter:

A:SETUP

and click on [OK] . (If you have inserted the floppy disk in drive B, replace "B" for "A".)

The installation program will install PROcalc for Windows in a directory called PROcalc on drive C by default, create a Program Group called Jupiter and create a Program Item for PROcalc. You may change the default directory during installation. If, for any reason, PROcalc's icon is not displayed as a picture of a calculator, you can register the icon as follows:

- Make sure the PROcalc Program Item has focus by clicking on it.
- Click on File and Properties
- Click on [Change Icon] and use [Browse] to locate the program, which is called PROCALC.EXE and will be in the directory you selected for installation.
- Select the program and accept the calculator icon.

Launch PROcalc

You may launch PROcalc by double clicking on the icon in the Jupiter Program Group.

Updating an existing installation

To update a shareware or earlier installation, simply copy PROCALC.EXE and PROCALC.REG from the issue disk to the directory containing your shareware version of the program.

Basic operations and the displays

Launch PROcalc

To launch PROcalc, double click on the PROcalc icon in the Jupiter Program Group.

The program will load and the Full Display will be presented for use. You may either proceed and use PROcalc in this mode, or click on [Small] to switch to the Small Display.

On loading, PROcalc will set all memories and registers to zero and present a new tally roll. For financial calculations, it will default to Advance mode as shown by "Mod" within the register display area.

Closing PROcalc

To close PROcalc, click on the [Exit] button displayed on either the Full or Small Display.

The displays

PROcalc contains a Full Display and a Small Display mode. The Full Display provides access to all available functions while the Small Display allows access to basic calculator and add listing functions. To get to the Small Display click on [Small] from the Full Display and to return to the Full Display click on [Full].

The Full Display

The full display is divided into 7 main areas:

- 1 The numeric keyboard, which is a display of the numeric key-pad showing how PROcalc interprets the keys in this area. You may enter numbers and function by either pressing on the buttons with a mouse click or pressing the appropriate key on the keyboard.
- 2 The entry area, above the numeric keyboard, shows the entry as it is made and displays the results of each calculation as your work progresses.
- 3 The register area, two windows at the top left of the display, providing a constant display of the contents of each of the registers maintained by PROcalc.
- 4 The function buttons, which are displayed immediately below the register display area. This area contains buttons that provide access to the more sophisticated financial, constant and memory functions of PROcalc. Most of the buttons will also respond to keyboard input, e.g. "p" to set the present value register to the figure shown in the display and "P" to calculate the present value. A full explanation of how these buttons operate, and their keyboard equivalents, is contained in the sections dealing with each function.
- 5 The clearing buttons. A column of buttons displayed to the left of the numeric keyboard.
- 6 The tally roll display. A display of 10 items from the current list. This area has a scroll bar displayed to its right which can be used to scroll the list up and down.
- 7 The action buttons. A row of buttons at the foot of the display which provide access to such things as configuration, copying, macros and printing.

The Small Display

The small display is divided into 4 areas:

- 1 The top buttons providing tally roll management and a switch to the Full Display.
- 2 The tally roll display.
- 3 The entry area.
- 4 The bottom buttons providing clearing, copying and macro facilities.

When the Small Display is shown basic calculator entries are carried out via the keyboard and the action buttons can be activated with the mouse or by pressing the appropriate key on the keyboard.

Clearing the calculator

There are four keys which clear the contents of the calculator, together with the equals key [=] which displays the result of the last calculation and clears the accumulator for the next calculation to be made. The four clear keys are as follows:

- C All Clear key which clears the internal accumulator and the entry display - Click on [C] or press "C" on the keyboard.
- CE Clear Entry key which clears the current entry only, leaving the accumulator and all other data in place - Click on [CE] or press "E" on the keyboard.
- Zap Zap Registers key clears the financial memories - N, i%, Pv, Fv and Pmt - Click on [Zap] or press "Z" on the keyboard.
- MC Memory Clear key clears the contents of the memory register - Click on [MC] or press "M" on the keyboard.

The contents of the constant register (used during calculations with constant), is automatically cleared when a normal calculation is carried out.

Undo

The undo key [Und] will reverse the last calculation carried out and remove it from the tally roll. You may undo any number of items back to the last total displayed on the tally list, simply press the [Und] key, or "U" on the keyboard the required number of times.

Fixed decimal place calculation

PROcalc defaults to floating point calculation mode, however, it is possible to fix the number of decimal places to any number between 0 and 8 and set the calculation mode to "Adding machine" whereby the calculator will assume that all entries are to 2 decimal places without you having to enter the decimal point. To do this click on [Fix], or press "D", and the calculation mode dialog will open. Select the number of decimal places required, floating or adding machine by clicking on the appropriate option button and then click on [OK].

All calculations will now be carried out based on the selection made.

Changing the sign of the displayed number

You may change the sign of the displayed number at any time by clicking on the [+/-] button or pressing "_" on the keyboard.

Keyboard and button functions

PROcalc responds to both button and keyboard input. The following is a list of the functions available and the button or key to press to activate it:

Button	Key	Function
[1] to [9]	1 to 9	Number entry
[.]	.	Decimal point
[+]	+	Add
[-]	-	Subtract
[*]	*	Multiply
[/]	/	Divide
[%]	%	Percentage
[=]	= or Return	Equals
[+/-]	$\bar{\quad}$	Change sign
	Back-space	Delete figure
[C]	C	Clear calculator
[CE]	E	Clear entry
[MC]	M	Clear memory
[Zap]	Z	Clear registers
[Und]	U	Undo entries
[Fix]	D	Fix decimal points
[Const.]	K	Store constant
[Sq.]		Square
[Rt.]		Square root
[X^Y]	^	Universal power
[no]/[No]	n/N	Set/calculate number of periods
[i%]/[I%]	i/I	interest rate
[pv]/[Pv]	p/P	present value
[fv]/[Fv]	f/F	future value
[pt]/[Pt]	r/R	payments
[Split]	S	Calculate capital/interest
[Bal.]	B	Calculate principal/accum. interest
[APR]	A	Calculate APR
[X<>Y]		Exchange with accumulator
[M<>Y]		Exchange with memory
[Mi]	Alt I	Memory in
[M+]	Alt +	Add to memory
[M-]	Alt -	Subtract from memory
[Mr]	Alt M	Memory recall
[Print]	Ctrl P	Print tally roll
[Clear]	T	Save and clear tally roll
[Load]	L	Load tally roll
[Set printer]	Alt N	Change printer/font
[Setup]	Alt U	Configure PROcalc
[Copy]	Alt C	Copy entry display to clipboard
[Tfr.]	Alt T	Copy tally roll to clipboard
[Paste]	Alt P	Paste data from clipboard
[Macro]	Alt O	Edit macros
[Run]	Alt R	Run a macro
or [Run Macro]		
[Small]	Alt S	Switch to small display
[Full]	Alt F	Switch to full display
[Exit]	Alt E	Close PROcalc
[About]	Alt A	About PROcalc
[Help]	Alt H	On screen help

Mathematical functions

Arithmetic calculations

To make entries to the calculator you may either press the appropriate key on the keyboard or click on the button displayed on the screen.

Plus [+] or "+" key - instructs the calculator to add the next entered value to the displayed number.

Minus [-] or "-" key - instructs the calculator to subtract the next entered value from the displayed number.

Multiply [*] or "*" key - instructs the calculator to multiply the displayed number by the next entered value.

Divide [/] or "/" key - instructs the calculator to divide the displayed number by the next entered value.

Equals [=] or "=" or "Return" key - completes all previously entered numbers and operations. This key is used to obtain both intermediate and final results.

To perform a simple addition, subtraction, multiplication and division just key in the problem as it is written. When each operation is keyed it completes the previously entered operation. This includes plus, minus, divide, multiply, [X^Y] and [%] (the latter two will be discussed later).

Example: Calculate $5.43 * 10.6 - 5.1$

Press	Display	Procedure
[C]	0	clear calculator
5.43 [*]	5.43	enter the key sequence
10.6 [-]	57.558	
5.1 [=]	52.458	

Correcting errors

If you enter an incorrect number, or press the wrong function button, you can always clear the calculation and begin again. In many instances, however, you can correct an entry error without clearing the entire calculation.

The [CE] or "E" key - clears incorrect entries by removing the contents of the entry display without carrying out any calculations or losing the running total of existing calculations.

The back-space key - removes the last digit or decimal point from the displayed number and allows you to change the contents of the entry display, before a mathematical function key is pressed, without having to clear the display and start again.

Example: enter 59123.4 and correct it to 59124.4 using back-space.

Press	Display	Procedure
[C]	0	clear calculator
59123.4	59123.4	enter incorrect number
<-<-<-	5912	remove the last two digits
4.4	59124.4	complete number

Powers and Roots

[Sq.] - squared key sequence - the [Sq.] key raises the displayed number to the second power, which is the same as multiplying the number by itself. The number can be any value whose square is in

the range of the calculator. Pressing this key causes the contents of the entry display to be raised to the power of 2 but does not complete any pending calculations before calculating the power. It is therefore possible to carry out calculations involving powers in the same order as they are shown in the formula.

For example to calculate $3 + 4 * 6^2$.

Press	Display	Procedure
[C]	0	clear calculator
3 [+]	3	enter number
4 [*]	7	
6 [Sq.]	36	find square
[=]	252	calculate result

[Rt.] - square root key - the square root key [Rt.] calculates the square root of the displayed number. The displayed number must be positive, otherwise the result will be shown as zero. Where an error does not occur the result is always positive. As with the [Sq.] key the square root calculation is carried out on the number shown in the entry display and does not cause any pending calculations to be completed before the root is found.

Example: calculate $3 + 4 * \text{Rt}(6)$.

Press	Display	Procedure
[C]	0	clear calculator
3 [+]	3	enter number
4 [*]	7	
6 [Rt.]	2.449489742	find square root
[=]	17.14642819	calculate result

[X^Y] or "^" - universal powers and roots - this key is used to compute X to the power of Y or the Y root of X, as follows:

To raise X to the power of Y:
Enter the number X
Press [X^Y]
Enter the power Y
Press [=] or any key that completes an operation

To find the Y root of X:
Enter the number X
Press [X^Y]
Enter the root Y
Press [+/-]
Press [=] or any key that completes an operation

Please note that although this entry sequence implies that X raised to a minus number results in the root of the number being calculated, this is simply a key sequence used for allowing roots to be calculated. The true mathematical formula for calculating the root of a number is to raise the number to the reciprocal of the root required.

Here are two examples illustrating the use of these key sequences.

Example 1: Calculate 2.4863 to the power of 2.7832

Press	Display	Procedure
[C]	0	clear calculator
2.4863 [X^Y]	2.4863	enter X value
2.7832	2.7832	enter Y value
[=]	12.61550338	calculate

Example 2: Find the 2.149 root of 93.268

Press	Display	Procedure
[C]	0	clear calculator
93.268 [X^Y]	93.268	enter X value
2.149 [+/-]	-2.149	enter Y value
[=]	8.252414704	Calculate

Percentage calculations

The percent key [%], or "%", can be used to calculate percentages, add-ons, discounts and percent of ratios. The base amount used for the calculation is the amount shown in the display when you begin the key sequence.

Key sequence and function:

[*]n[%]	percentages - calculated n% of the base amount.
[+]n[%]	add-on - calculates n% of the base amount and adds the calculation to the base amount.
[-]n[%]	discount - calculates n% of the base amount and subtracts the calculation from the base amount.
[/]n[%]	percentage ratio - express the base amount as a percentage of n.

Percentage example: calculate 5% of 382:

Press	Display	Procedure
[C]	0	clear calculator
382 [*] 5 [%]	19.1	calculate percentage

Add-on example: calculate 1750 + 15% added on:

Press	Display	Procedure
[C]	0	clear calculator
1750 [+] 15[%]	262.5	calculate & display add-on
[=]	2012.5	calculate result

Discount example: calculate 149.75 - 10% discount

Press	Display	Procedure
[C]	0	clear calculator
149.75 [-] 10[%]	14.975	calculate & show discount
[=]	134.775	calculate result

Ratio example: what is 129.37 as a percentage of 200

Press	Display	Procedure
[C]	0	clear calculator
129.27 [/] 200 [%]	64.635	calculate result

Calculating with constants

You can use the calculator's constant register to store a figure and calculation type to be used repeatedly in a series of calculations.

The procedure for carrying out calculations with constants is the same, irrespective of the arithmetical function to be carried out, as follows:

- Enter the constant
- Enter the arithmetical function (+, -, * or /)
- Press the constant in key [Const.] or "K"
- Enter the number to which the constant is to be applied followed by [=] to display the result
- Continue entering each number to which the constant is to be applied followed by [=].

As soon as any other mathematical function key is pressed, the contents of the constant register will be cleared and normal calculations can be carried out.

Example: To add 13.75 to each of 25, 50, 75 and 100

Press	Display	Procedure
[C]	0	clear calculator
13.75[+][Const.]	13.75	enter number and store in the constant register - note that the number with the sign appears in the "Cnst" position
25 [=]	38.75	add to each number
50 [=]	63.75	
75 [=]	88.75	
100[=]	113.75	

Example: To deduct 13.75 from each of 25, 50, 75 and 100

Press	Display	Procedure
[C]	0	clear calculator
13.75[-][Const.]	13.75	enter constant amount
25 [=]	11.25	carry out calculations
50 [=]	36.25	
75 [=]	61.25	
100[=]	86.25	

Example: Multiply each of the numbers 25, 50, 75 and 100 by 13.75

Press	Display	Procedure
[C]	0	clear calculator
13.75[*][Const.]	13.75	enter constant
25 [=]	343.75	carry out calculations
50 [=]	687.50	
75 [=]	1031.25	
100[=]	1375	

Example: Divide 25, 50, 75 and 100 by 13.75

Press	Display	Procedure
[C]	0	clear calculator
13.75[/][Const.]	13.75	enter constant
25 [=]	1.818181818	carry out calculations
50 [=]	3.636363636	
75 [=]	5.454545454	
100[=]	7.272727272	

Memory functions

You can use the calculator's memory to store, sum, and recall a number. Pressing [MC] or "M" clears the memory of its current contents, however the other clear keys leave the contents of the memory intact.

When PROcalc is first activated, the contents of the memory register will be zero. If PROcalc has previously been used since the computer was switched on, it will retain the value in the memory from the last time PROcalc was used during the current run.

The memory can store any number within the range of the calculator.

Memory store, clear and recall

[Mi] - Memory in key - this stores the displayed numeric value in the memory, replacing any previously stored figure.

[MC] - Memory clear key - to clear the memory at any time press the [MC] key, or "M", and the contents of the memory will be zeroised. Pressing this key has no effect on the contents of any other register or on any pending calculations.

When zero is displayed in the entry field, pressing [Mi] will store zero in the memory, thereby producing the same result as the memory clear key.

[Mr] - Recall memory key - this key recalls the number stored in memory, without affecting the contents of the memory. The amount recalled is placed in the entry display as though you typed it in from the keyboard and can therefore be used in a string of calculations.

Memory arithmetic

Two keys are provided to allow you to carry out calculations on the figure stored in the memory:

[M+] - sum key - this key adds the number shown in the entry display to the contents of the memory.

If you want to add a series of numbers to the memory, you should use [Mi] to store the first number (thereby replacing any previous value) and then use the [M+] key with the remaining numbers.

[M-] - subtract key - this deducts the displayed number from the contents of the memory.

Example: Add the following numbers to the memory: 27.3, 87.5, 15% of 150 and then deduct 10% of 273, recalling the result.

Press	Display	Procedure
[MC]		clear memory
27.3 [Mi]	27.3	store first figure
87.5 [M+]	87.5	add number memory
150[*]15[%][M+]	22.5	calculate and add
273[*]10[%][M-]	27.3	calculate and subtract
[MR]	110	display result

Memory exchange

[M<>Y] - This key exchanges the current contents of the entry display and the memory register. Use of this key has no effect on pending calculations thereby enabling the contents of the memory used in a string of calculations.

Accumulator exchange

[X<>Y] - This key allows you to exchange the contents of the entry display with the accumulator thereby reversing a calculation. Pending calculations, other than the accumulator contents, remain unaltered.

Example: Calculate $127 / (32 + 63)$

Press	Display	Procedure
[C]	0	clear calculator
32 [+]	32	enter number
63 [/]	95	add 2nd number
127[X<>Y]	95	enter 127 and exchange
[=]	1.336842105	calculate result

Financial functions

This section sets out the keys used for financial calculations, together with some basic concepts.

Compound interest

The value of an amount of money is affected by interest over a period of time. Compound interest is interest earned not only on the original amount of the principal, but also on the interest earned in previous compounding periods. The interest you earned from the previous accounting period becomes part of the principal for the next compounding period.

Note: for compound interest calculations of this nature no payment is involved and the payment register must be zero. When the payment register has a value other than zero, the calculator treats the problem as an annuity. Annuities are discussed below.

When the compounding process is reversed, the interest is discounted. Discounting is used to compute the value today, (present value), of the future cash flow (future value).

For example, £121 is received after two years. What is the present value if the annual interest rate is 10% compounded annually? The interest earned in each year can be taken off, as follows:

Formula

$$121 - (1 + 10\%) = 110,$$

$$110 - (1 + 10\%) = 100$$

Thus the present value of £121 received at the end of 2 years is £100 assuming an interest rate of 10% compounded annually.

In compound interest calculations, the four keys listed below are used to enter or calculate the values.

N - the total number of compounding periods [No] or "N"

i% - the percentage interest per compounding period [I%] or "I"

Pv - the present value of a future amount [Pv] or "P"

Fv - the future value of a present amount of money [Fv] or "F"

The lower case version of the key causes PROcalc to place the current contents of the entry display in the corresponding register, while the upper case version instructs PROcalc to calculate the value based on the contents of the other registers.

As you use these keys the value you place, or calculate, in each register is shown in the register display area.

To perform a compound interest calculation, you must know any three of the four values (No, i%, Pv or Fv) and the calculator can compute the missing value.

To enter a value to a register, type in the value, or carry out a calculation, so that the amount appears in the entry display and then press the lower case version of the appropriate key to store the value in the register.

To request the calculator to compute an unknown value the upper case version of the key is used, for example [I%] or "Shift I" will compute the interest rate for each compounding period.

Before carrying out any calculations you should first clear the registers by pressing the register clear key [Zap] or "Z".

Example: If I deposit £10,000 in a saving account that earns 12% nominal interest compounded quarterly, what amount will be in the account at the end of 5 years.

Press	Display	Procedure
[Zap]		clear registers
5[*]4[=] [no]	20	enter number of compounding periods
12[/]4[=] [i%]	3	quarterly interest rate
10,000[pv]	10000	enter deposit
[Fv]	18061.11234	calculate amount after year 5

Note that as you store each figure and carry out the calculation, the figures also appear in the register display. These figures will remain there until cleared or changed by the entry of new figures. The key sequence you have entered is also displayed on the tally roll.

Example: I need £10,000, in 3 years time, to replace a machine. How much do I need to invest today in an account bearing interest at 10%, compounding quarterly.

Press	Display	Procedure
[Zap]		clear registers
3[*]4[=] [no]	12	compounding periods
10[/]4[=] [i%]	2.5	interest rate
10000[fv]	10000	amount required
[Pv]	7435.55885	calculate investment required

Calculation of the interest rate and number of periods can be carried out in a similar way by entering the three known figures followed by a calculation of the unknown.

Annual percentage rate - APR

In the examples shown above the nominal interest rate is applied to each compounding period. The true rate of interest for the year as a whole will be higher than that applied each quarter due to the compounding effect of the interest on interest.

The calculator provides a function to allow you to compute the APR for any given rate of interest and number of compounding periods.

[APR] - annual percentage rate key - is used to calculate the annual percentage rate for any given interest rate press [APR] or "A".

Example: In the above example the rate of interest was 10% compounding quarterly. What is the APR?

NOTE: If you have not cleared the calculator and 2.5 is still stored as the interest rate you need not carry out the first two key sequences which are designed to enter the interest rate in the register.

Press	Display	Procedure
[Zap]		clear registers
10[/]4[=][i%]	2.5	interest rate
4[APR]	10.38128906	calculate APR for 4 compounding periods

Annuities

An annuity is a series of equal payments made at regular time periods, with interest calculated at the end of each period.

Ordinary annuities - With ordinary annuities payments occur at the end of each payment period. Most loans are in this category.

Annuities due - With annuities due payments occur at the beginning of each payment period. Most leases are in this category.

The calculator provides two computational modes, shown as Arrears and Advance. When Arrears is shown, PROcalc is calculating on the basis of ordinary annuities. When Advance is shown calculations are being carried out for annuities due.

Annuity keys

In annuity calculations, the six keys listed below are used to enter or calculate the values.

- Mode - Toggles between the advance and arrears modes [Mode]
- No - The total number of payment of periods [No] or "N"
- i% - The percentage interest per payment period [i%] or "I"
- Pv - The present value of a series of payments [Pv] or "P"
- Fv - The future value of a series of payments [FV] or "F"
- Pt - The amount of the regular payment [Pt] or "R"

Entry of the known figures to the registers is carried out in exactly the same way as for compound interest problems, by entering the figures, and then pressing one of the lower case versions of the key, and the computation of the unknown is done by pressing the upper case version of the key.

As entries are made to the financial registers, they are displayed in the register section of the screen. The current mode of calculation is also shown in the register section.

Performing annuity calculations

Irrespective of the type of calculation being carried out, e.g. loan repayment, regular savings etc., all amounts are entered into the register as positive figures. The computer will determine the type of problem based on the register contents and the calculation being invoked.

To perform an annuity calculation you must know three of the four values which will be used. Note that when dealing with financial calculations the system has to make a decision about the type of calculation being requested. This is based on the contents of the registers and the variable being calculated. In some cases it also has to decide which registers to use and which to ignore. The

rules which are used are as follows:

Calculation of present value

- If payment does not equal zero - annuity calculation is based on number of periods and the interest rate.
- If payment equals zero - discounting calculation is based on future value, interest rate and number of periods.

Calculation of future value

- If payment present - annuity calculation is based on number of periods and interest rate.
- If no payment present - compound interest calculation is based on present value, interest and number of periods.

Calculation of payment

- If present value does not equal - then loan repayment calculation is based on number of periods and interest.
- If present value equals zero - regular savings calculation is based on future value, interest rate and number of periods.

Calculate number of periods

- If both the present value and future value are not equal to zero - a compound interest calculation of the number of compounding periods required to move from the present value to the future value.
- If present value does not equal zero and the future value is zero - loan repayment calculation is based on payment stored and interest rates.
- If present value equals zero and future value does not equal zero - regular savings calculation is based on future value, payment and rate of interest.

Calculate interest rate

- If the future value, present value and payment registers contain data - the calculation is of lease type with residual value based on the number of periods.
- If both future value and present value do not equal zero, but the payment register is zero - the calculation is of compound interest type based on the number of periods.
- If present value does not equal but the future value is zero - the calculation is of loan repayment type based on payment and number of periods.
- If future value does not equal zero but the present value is zero - a regular savings calculation is carried out based on payment and number of periods.

In the above description the calculation for loans can also be read as calculations relating to purchased annuities.

It should be noted that for the calculation of present value, future value and payments the tests are carried out in the order shown. If, therefore, when carrying out a payment calculation a figure appears in the present value register, a loan type calculation will be performed even if a figure also appears in the future value register.

The following procedure is used to find an unknown value:

- 1) Clear the registers
- 2) Select the correct mode of calculation
- 3) Enter the known values
- 4) Compute the unknown value

Calculations for annuity interest and number of periods are carried out by iteration and can, on slower machines, take two or three seconds. Any key pressed on the keyboard during this period will be stored in a buffer and acted on when the calculation has been completed.

If the known values entered do not make sense to the calculator, an error condition will result and the word "Error" will be displayed. For example an infinite number of periods would result if the payment under an annuity is less than the interest each period.

Example: Loan - A loan of £7,500 is to be raised to buy a new car. Monthly repayments have been quoted for a 3 year period at £280 per month, in advance. Calculate the monthly interest rate and the APR.

Press	Display	Procedure
[Zap]		clear registers
[Mode]	Advance	select mode
7500[pt]	7500	enter present value
3[*]12[=][no]	36	term
280[Pt]	280	repayments
[I%]	1.80369631	calculate interest for each period
12[APR]	23.92603677	calculate APR

Example: Annuity - a man of 65 wishes to place a sum of money in a fixed interest bearing account against which he wishes to draw £500 per month for 10 years, extinguishing the balance of the capital over that time. Current interest rate is 13% and he will draw the sum at the end of each month. How much money does he have to invest?

Press	Display	Procedure
[Zap]		clear registers
[Mode]	Arrears	select mode
500[pt]	500	enter withdrawal
10[*]12[=][no]	120	number of periods
13[/]12[=][i%]	1.08333333	monthly interest
[Pv]	33487.20930	calculate investment

Example: Regular savings - I wish to invest £50 a month in a TESSA account which credits interest monthly and carries an interest rate of 12.5% what will be the balance on the account at the end of the 5 year period.

Press	Display	Procedure
[Zap]		clear registers
[Mode]	Advance	select mode
50[pt]	50	regular investment
5[*]12[=][no]	60	number of periods
12.5[/]12[=][i%]	1.041666667	monthly interest
[Fv]	4181.748012	calculate fund

Example: Interest rates - I have been investing £100 per month in a pension fund for 25 years and have received notification that the fund is now standing at £525,000, what is the effective rate of annual interest?

Press	Display	Procedure
[Zap]		clear registers
[Mode]	Advance	set mode
100[Pt]	100	amount of payment
25[*]12[=][no]	300	store periods
525000[fv]	525000	fund value
[I%]	1.455445160	monthly interest
12[APR]	18.93353554	annual percentage rate

Calculating interest and principal

The functions described in this section are especially for amortisation of annuities such as loans or leases and will only work if sufficient data is contained in the financial registers to enable a calculation to be carried out.

[Bal.] - accumulated interest and balance key - This calculates the remaining loan balance, principal, after a selected payment, together with the cumulative amount of interest which has been paid up to that point in time. You can also use "B" on the keyboard to carry out the same operation.

To carry out the calculation:

- 1) Clear the calculator and select the appropriate mode.
- 2) Enter the appropriate values with the [no], [i%], [pt] and [pv] keys. If there is an unknown item it should be calculated before the [Bal.] key is used. If you know the future value in respect of the annuity but not the present value, calculate the present value first.
- 3) Enter the payment number
- 4) Press [Bal.].

The computer will calculate the figures and display the principal outstanding and accumulated interest on the tally roll. The accumulated interest will also be displayed in the entry display.

[Split] - split interest and principal key - This key calculates the interest and principal proportions of a single payment. You can also use "S" on the keyboard to carry out the same operation.

To find the interest and principal of a single payment:

- 1) Clear the calculator and select the appropriate mode.
- 2) Enter the appropriate values with the [no], [i%], [pt] & [pv] keys.
- 3) Enter the payment number.
- 4) Press [Split] to calculate the interest and principal elements of the payment.

When the [Split] key is pressed, the capital and interest elements of the payment are shown on the tally roll and the interest element is shown in the entry display.

Example: I have made 18 payments on my mortgage. The mortgage was for £75,000 for 25 years, with an annual interest rate of 12.5% compounded monthly.

I have four questions:

- 1) Are the payments I am making correct?
- 2) What is the current balance outstanding on the loan?
- 3) What are the interest and principal portions of my last payment?
- 4) What is the total interest I am going to pay over the period of the mortgage?

Press	Display	Procedure
[Zap]		clear registers
[Mode]	Arrears	set mode
75000[pv]	75000	amount of loan
25[*]12[=][no]	300	term
[12.5][/][12][=]		
[i%]	1.0416666666	monthly interest
[Pt]	817.7656025	calculate payment
18[Bal.]	74281.15919	balance of loan o/s
	14000.94004	interest paid to date
18[Split]	43.54988292	capital element of payment
774.2157195		interest element of payment
300[Bal.]	-0.00000598	balance of loan o/s i.e. 0
	170329.6807	interest over term of mortgage

Once the information is contained in the financial registers, it is possible to recall any one of the registers by using the register key in conjunction with the shift key. This will recall the value of the register to the entry display and it can then be used in further calculations. For example an alternative way to calculate the total interest which will be paid over the term of the above mortgage is as follows:

Press	Display	Procedure
[Pt]	817.7650205	recall payment
[*]300[=]	245329.6807	calculate total payments over 25 years
[-]75000[=]	170329.6807	deduct original loan to final of total interest

Managing the tally roll

All actions carried out within PROcalc are recorded on the tally roll. This list is displayed on both the Full and Small Displays and can be scrolled, saved and cleared, loaded and printed.

Scrolling

As you enter data into PROcalc the last 10 entries on the tally roll are always displayed. You may scroll through the entries at anytime by clicking on the arrow heads at the top and bottom of the scroll bar next to the list. You may also click on the bar itself to obtain larger jumps through the list.

The scroll box displayed within the scroll bar gives an indication of your current position within the list. You may drag the scroll box up and down the bar to move directly to a point in the list.

As soon as you do anything that requires the list to be changed, the system will redisplay the last 10 entries.

Print the tally roll

You may print the tally roll to the currently selected printer in a font of your choice. On loading PROcalc the Windows default printer will be selected, but you may change this using [Set printer], see below. The default font of Arial 10 point may also be changed using this option.

To print the list click on [Print], or press "Ctrl P". PROcalc will ask you to enter a name for the listing, "PROcalc listing" by default. Enter the name you wish to use and click on [OK]. If you do not wish to proceed click on [Cancel].

The stock print dialog box will be displayed and from this you can select the number of copies you would like printed and restrict the listing to a range of pages if you do not wish the whole list printed. For example, you may only be interested in the last 40 or so entries and in this case you may only wish to print the last page of the listing. Make your selection and click on [OK]. You may also change the settings of the printer by clicking on [Setup...].

After the listing has been printed the system will return to the calculator display.

Select printer

If you wish to change the printer current selected, click on [Set printer] and then on the button by "Select printer". The stock select printer dialog will be displayed and you can select and setup the printer you wish to use. For information on how to use this dialog please refer to your Windows manual.

Once you have made your selection, click on [OK] and you will be returned to the set printer dialog. From this you may either select the font you wish to use, see below, or click on [OK] to return to the calculator display.

Select font

PROcalc allows you to select the font style and size you wish to use to print your listings.

Click on [Set printer] and then on the button by "Select font". The stock font dialog box will be opened with the font currently in use displayed. Select the font, font style and size and then click on [OK] to return to the set printer dialog. Click on [OK] to return to the calculator display.

For more information on using the font dialog box, refer to your Windows manual.

Clearing and saving the tally roll

PROcalc maintains up to 9 tally rolls stored on disk and allows you to retrieve them by name. The 9 slots are used in rotation so, if they have all been used, the oldest one is disposed of to make way for the new list. If you wish to keep a permanent copy of a list, you can either copy the file in which it is recorded, or transfer the list to the clipboard and paste it into another program.

The files maintained by PROcalc are called LISTING.1 to LISTING.9 and when you save a listing you are informed of the number used.

To clear and/or save the tally roll, click on [Clear] or press "T". The system will invite you to enter a name for the tally roll and inform you of the slot number in which it is to be saved. Enter the name and click on [OK]. The data will be saved and the tally roll cleared. If you click on [Cancel] the system will not save the tally roll and will ask you to confirm that you would like the data cleared. Click on [Yes] if you wish it to be cleared or [No] to return to the calculator display without clearing the list.

Loading an old tally roll

To load an old tally roll to view or print, click on [Load] or press "L". The system will display the select list dialog box in which will be listed the names of the 9 tally rolls stored on disk.

If you do not wish to continue, click on [Cancel] and you will be returned to the calculator display with the existing tally roll unchanged. If you wish to continue and load the old data, either double click on the name of the list or click on it and then on [OK]. The data will be loaded and you will be returned to the calculator display.

You are now free to scroll through the data, print it or copy it to the clipboard.

Copying and pasting

Three buttons are provided to enable you to copy and paste data to and from the clipboard.

- [Copy] Copy the contents of the entry display to the clipboard
- [Tfr.] Transfers the entire tally roll to the clipboard
- [Paste] Pastes the contents of the clipboard into PROcalc

Copy current number to the clipboard

To copy a single number to the clipboard, ensure that it is shown in the entry display, it may be the result of a calculation or a figure typed in, and click on [Copy].

Copy the entire tally roll to the clipboard

To copy the entire tally roll to the clipboard, click on [Tfr.]. The complete list will be copied and will be available for import into other applications.

Paste from the clipboard

Clicking on [Paste] will paste data from the clipboard to the calculator just as though you has typed the data on the keyboard. This can either be a single number, e.g. 123.45, or a whole string of numbers and operators, e.g. 123.45+987.54*10%. PROcalc will read the characters one at a time and use them to carry out the calculation, discarding any characters which are not valid.

Example: If you type the following in a word processor and copy it to the clipboard, you can then paste it into PROcalc to carry out the calculation:

```
123.45      Cost of item A
+234.56     Cost of item B
-10%       Discount
```

PROcalc will accept the data ignoring the letters, and carry out the calculation. However, be careful what you type - if we had called the above Item 1 and item 2, PROcalc would have taken in the 1 and 2 and the cost of the items would have become 123.451 and 234.562!

Creating and using Macros

General description

PROcalc includes the facility to allow you to create and use up to 5 named macros of up to 30 characters each. A macro is a string of keystrokes which are stored and may be replayed at will. You can use this facility to carry out any repetitive tasks, and they are very useful for such things as VAT calculations.

When first installed PROcalc will have 4 macros defined to do the following:

- Gross up for VAT @ 17.5%
- Calculate VAT @ 17.5%
- Extract VAT from Gross
- Extract Net from Gross

You may use these at any time by clicking on [Run] and change them by clicking on [Macro].

The keystrokes stored in a macro are those you would have typed at the keyboard to achieve the calculation. For example, to gross up for VAT at 17.5% you would type the net amount followed by:

+ 17.5 % =

and this is the string you type in as the macro key strokes. You may include spaces to improve the legibility of the string as PROcalc will ignore these and any other character that it would not accept from the keyboard.

To create or edit a macro

Click on [Macro] and the macro definition dialog will be opened. In this will be listed any macros which are currently defined. You may move through the list using the Tab key and back using Shift Tab. You may also click on a field with the mouse to select it for editing.

Enter the name of the macro and the key strokes to use, either in a vacant slot or by overwriting an old macro which is no longer required.

After you have entered the new data click on [OK] and your changes will be saved. If you have made an error, or do not wish to save your changes, click on [Cancel].

To run a macro

To run a macro, enter the data on which the macro is to operate and click on [Run], or [Run macro] on the small display. The run macro dialog will be opened in which will be listed any macros currently defined. Click on the button next to the name of the macro to be run and it will be executed.

If you decide that you do not wish to run any of the macros listed, click on [Cancel].

Configuring PROcalc

Using the [Setup] button, you may make the following changes to the way in which PROcalc is configured:

- Select display foreground and background colours
- Select calculator foreground and background colours
- Choose between a colour or bitmap background
- Select the bitmap to use for the background
- Set the keep on top option

Select display foreground and background

The display foreground and background colours are used for the display of the entry area and the contents of the registers. By default these are set to green on black.

To change this setting, click on [Setup] and then on the button by "Display foreground". The stock colour dialog box will be displayed from which you can select the colour you wish to use, followed by [OK]. Please refer to your Windows manual for further information on how to use this dialog.

After you have selected the colour you will be returned to the PROcalc setup dialog. Click on the button by "Display background" and select the colour you wish to use, followed by [OK].

Click on [OK] in the PROcalc setup dialog and you will be returned to the PROcalc display. If you have changed any of the settings you will be able to see their effect on returning to the calculator display.

Select calculator foreground and background

The calculator foreground and background colours are used for the display text printed on the surface of the calculator and, if the colour background is selected, the main colour of the calculator display. By default these are set to black on light grey.

To change this setting, click on [Setup] and then on the button by "Calculator foreground". The stock colour dialog box will be displayed from which you can select the colour you wish to use, followed by [OK]. Please refer to your Windows manual for further information on how to use this dialog.

After you have selected the colour you will be returned to the PROcalc setup dialog. Click on the button by "Calculator background" and select the colour you wish to use, followed by [OK].

Click on [OK] in the PROcalc setup dialog and you will be returned to the PROcalc display. If you have changed any of the settings you will be able to see their effect on returning to the calculator display.

Change bitmap

You have the option of using a bitmap as the background to the calculator, or a plain colour. If you are using a bitmap, you may use one of the 3 bitmaps supplied or any other bitmap recorded on your system. The three bitmaps supplied are:

SANDBLST.BMP
MARBLE.BMP
PAPER.BMP

However, some of the standard bitmaps provided with windows make very nice backgrounds, e.g.

CHITZ.BMP
CASTLE.BMP
REDBRICK.BMP

To change the bitmap in use, select [Setup] and click on the button by "Change bitmap". The stock file open dialog will be displayed and the current bitmap in use will be offered as the file name. You may use all the options of the dialog box to search your hard disk for a bitmap to use. After you have selected the bitmap, click on [OK] and you will be returned to the PROcalc setup dialog. Click on [OK] within the setup dialog to return to the calculator display and see the effect of the changes you have made.

Background in use

You can set PROcalc to either use a plain colour as the background to the display or a bitmap of your choice. By default, the system will use the SANDBLST bitmap supplied with the program.

To change the current setting click on [Setup] and then either on the Colour or Bitmap option button to select the mode desired. Click on [OK] and the system will return to the calculator display invoking the option you have selected.

If you have selected Bitmap as the background and you do not have a valid bitmap file selected, the system will inform you of this fact and revert to a colour background.

Keep on top

This option is provided to allow you to set PROcalc so that it is always displayed on top of your current application. In this mode both displays and the icon will always be shown ensuring that PROcalc is only a click away.

To change the Keep on Top option, select [Setup] and click on the Keep on top check box. When the option is selected, and "x" will appear in the check box. Click on [OK] and the system will return to the calculator display saving and invoking your selection.

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Registering PROcalc™

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- 2 A printed manual
- 3 Free support
- 4 The right to download future releases of PROcalc labelled 1.xx, which will operate as registered versions of the program, or, if they prefer, to order a copy for a small handling charge.

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COMPUSERVE in \$

Users with a CompuServ account can register using the SWREG service. Simply join SWREG and follow the instructions to register. PROcalc is in the database with an ID of 3223. Your CompuServe account will be debited with the registration fee of \$35.

Arithmetic example

Example:	Calculate $5.43 * 10.6 - 5.1$	Press	Display	Procedure	C	0
	clear calculator	$5.43 *$	5.43	enter the key sequence	$10.6 -$	
57.558	$5.1 =$	52.458				

