Owner's Guide

V10 Financial Calculator

Preface

Congratulations on your purchase of the V10 financial calculator from Victor Technology. Victor has been serving customers since 1918. Today, Victor offers a complete line of printing, handheld, desktop, scientific, and financial calculators. For more information please see our website at www.victortech.com or call us at 1-800-628-2420.

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V10 Financial Calculator Limited Warranty

Contents

SPECIFICATION FOR THE FINANCIAL CALCULATOR

I. General Description

* Two modes of calculator, i.e., Standard Calculator mode and Prompted Worksheet mode

* In standard calculator mode, the following functions can be implemented.
  - 4 basic rule arithmetic operation
  - Parentheses calculation
  - Trigonometric functions (sin, cos, tan, $\sin^{-1}$, $\cos^{-1}$, $\tan^{-1}$)
  - Hyperbolic functions and Inverse hyperbolic functions ($\sinh$, $\cosh$, $\tanh$, $\sinh^{-1}$, $\cosh^{-1}$, $\tanh^{-1}$)
  - Natural logarithm and Exponential function ($\ln$ / e^x)
  - Square root, Square, Reciprocal functions ($\sqrt{\ }$, x^2, $1/x$)
  - Power function and Inverse power function (x^y, $\sqrt[x]{\ }$)
  - Permutation, Combination and Factorial (nPr, nCr, $x!$)
  - Constant calculation
  - Two angle units, i.e. Deg and Rad
  - Time value of money (TVM) calculation

* In Prompted Worksheet mode, there are 11 worksheets ready for selection.
  - Amortization worksheet
  - Cash Flow worksheet
  - Bond worksheet
  - Depreciation worksheet
  - Statistics worksheet
  - Percent change/Compound Interest worksheet

- Interest Conversion worksheet
- Date worksheet
- Profit Margin worksheet
- Breakeven worksheet
- Memory worksheet

* 3.0 volt operation

* Both manual OFF and 5 or 6 -minutes auto-OFF are available to save power consumption.

II. LCD DISPLAY

III. Key Matrix

QUIT CPT	SET ENTER	DEL ↑	INS ↓	ON/OFF
2ND	CF	NPV	IRR	→
x P/Y N	P/Y I/Y	Amort PV	BGN PMT	CLR TVM FV
K %	√	x²	1/X	Rand ÷
Hyp INV	SIN (	COS)	TAN y^x	X! ×
e^x LN	DATA 7	STAT 8	BOND 9	nPr −
Round STO	Depr. 4	Δ% 5	Brkevn 6	nCr +
RCL	Date 1	I Conv. 2	Profit 3	ANS
CLR WORK CE/C	MEM 0	Format •	Reset +/-	=

IV. Operation Description

a. Power Up Reset :-

Upon power up reset, standard calculator mode is defaulted. And the settings (including general memories, parameters of different worksheets and global settings) are as follows :-

Global setting   :-

Decimal places   :- 2

Angle unit   :- DEG (degree)

Date format   :- U.S. (MM - DD - YY)

Separator format   :- U.S.

Calculation method :- Chain (Chn)

Constant Memories :-

M0 to M9 is preset as 0.

Variable inputs in different worksheets :-

TVM & Amortization :- P/Y, C/Y = 12
        N, I/Y, P V, PMT, FV = 0
        End-of-period payment
        is defaulted P1, P2 = 1
        BAL, PRN, INT = 0

Cash Flow worksheet :- CF0 = 0
        C01 - C24 = 0
        F01 - F24 = 0
        I, NPV, IRR = 0

Bond worksheet   :- SDT, RDT :- 12-31-1990
        (US format) RV = 100
        Day-count method :- ACT
        Coupon frequency :- 2/Y
        CPN, PRI & YLD = 0

Depreciation worksheet :- LIF, MO1, YR = 1
        CST, SAL = 0
        SL method is defaulted.
        DB% = 200

Percent change worksheet :- OLD, NEW, %CH=0
PD=1
Interest conversion NOM, EFF = 0
worksheet :- C/Y = 12
Date worksheet :- DT1, DT2 :-12-31-1990
DBD = 0
Day count method :- ACT
Profit margin worksheet :- CST, SEL, MAR = 0
Breakeven worksheet :- FC, VC, P, PFT, Q=0

b. Warm Reset of the Calculator

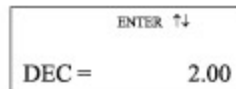Press [2nd][Reset], the display will show

```
        ENTER

   RST ?
```
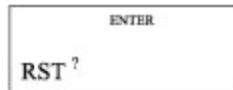
To reset the calculator, press [ENTER] to confirm. "RST" and "0.00" will be displayed.

```
   RST        0.00
```

Note:- Resetting erases all previously stored values and restores all default settings. If one doesn't want to reset the calculator, he/she can press [2nd][QUIT] to cancel the 'RESET' command. "0." will be displayed instead.

```
               0.
```

In either cases, the calculator will be switched back to Standard Calculator mode.

c. ON/OFF of the Calculator

When the calculator is ON, press [ON/OFF] to turn off the calculator. And the following operations will be executed :-
* Clear the display
* Cancel any unfinished calculation
* Clear any error condition

But the memories M0 to M9, all worksheet values and settings, and all format settings will be retained.

When the calculator is OFF, pressing [ON/OFF] can turn on the calculator. If the calculator has been turned OFF manually, the calculator will return to operation in the standard calculator mode. A value of zero is displayed and the values in all of the worksheets are kept unchanged.

If the calculator is turned off automatically, press [ON/OFF] to turn on the unit and the calculator will restore all the states as it is before power down.
If there is an error before power is shut off, one has to press [CE/C] to clear it before he/she can continue with the calculation.

d. Global Data Setting :-

Pressing [2nd][Format] can access all the global settings available. The followings are involved in the setting :-
* Decimal format
* Angle unit (degree / radian)
* Date format
* Separator format
* Calculation method

Decimal Format Setting

The first item shown at the entry of format setting is the selection for decimal places.

```
        ENTER ↑↓

   DEC =       2.00
```

The default decimal place number is '2'.
If one wants to change it to 3 decimal places, he / she can press [3] followed by [ENTER] to set the decimal places to 3.
[3][ENTER]

```
        ENTER ↑↓

   DEC =       3.000
```

Remarks :-
Notation for other decimal place number selection is as below :-

0.	---	no decimal places
1.0	---	one decimal place
2.00	---	two decimal places
3.000	---	three decimal places
4.0000	---	four decimal places
5.00000	---	five decimal places
6.000000	---	six decimal places
7.0000000	---	seven decimal places
8.00000000	---	eight decimal places
9.000000000	---	nine decimal places

It should be noted that only displayed results are rounded to the specified number of decimal places, but stored results are normally not rounded. The results are stored in memory as a 12-digit mantissa and 2-digit exponent no matter how many decimal places being specified.
To proceed to other global settings, the user can press [↑] or [↓].

Angle Unit Selection

In the Angle Unit selection page, the current angle unit will be displayed. For

example, let the current angle unit be Degree,

```
        SET ↑↓

   DEG
```
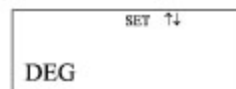
To switch to Radian, the user should press [2nd] [SET].

```
        SET ↑↓

   RAD
```

Consecutive pressing of [2nd][SET] toggle angle unit between degree and radian.

Date Format Selection

Two date formats are available. One is US format (MM - DD - YY) and the other is European format (DD - MM - YY). At entering the Date Format page, the current date format will be displayed. Say, current date format is US type,

```
        SET ↑↓

   US    12 - 31 - 1990
```
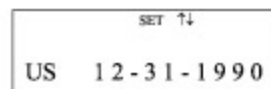
One can press [2nd][SET] to switch to European date format.

```
        SET ↑↓

   EUR  31 - 12 - 1990
```
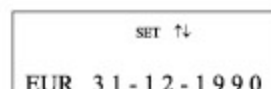
Pressing [2nd][SET] consecutively can toggle the date format alternately.

Separator Format Selection

Both US. format and European format are available. Pressing [2nd][*SET*] consecutively can switch from one format to another and back again.
U.S. format :

```
                    SET ↑↓

    US        1,000.00
```

European format :

```
                    SET ↑↓

    EUR       1.000,00
```

Calculation Method Format

The user can select either the chain calculation method or the algebraic operating system (AOS). When the calculation method is set to Chain, the calculator solves problems in the order that you enter them. When the calculation method is set to AOS, the calculator solves problems according to the standard rules of algebraic hierarchy as below :-

Priority	Operations
Highest	x^2, $x!$, $1/x$, $\%$, $\sqrt{\ }$, LN, e^x, HYP, SIN, COS, TAN
2	$_nC_r$, $_nP_r$
3	y^x
4	$\times$, $\div$
5	$+$, $-$
6.	$(\ ,)$
Lowest	$=$

At entering the Calculation Method Selection page, the current calculation method will be displayed, say, Chain method is under way.

```
                    SET ↑↓

    Chn
```

Press [2nd][*SET*] to switch to AOS and press again to switch back.

```
                    SET ↑↓

    AOS
```

If the user wants to restore all the settings above to default setting, he/she can simply press [2nd] [*CLR WORK*] during the display of format setting. Or he/she can press [2nd][*QUIT*] to exit from Format setting and returns to Standard Calculator mode.

e.Standard Calculator Operation :-

e-1. The following functions are available in Standard Calculator mode.

Functions	Examples of key combinations
Addition	a [+] b
Subtraction	a [−] b
Multiplication	a [×] b
Division	a [÷] b
Universal Power	a [y^x] b
Parentheses	a [×] [( ] b + c [ )]

Functions	Examples of key combinations
Percent	a [×] b [%]
Percent ratio	a [÷] b [%]
Percent add-on	a [+] b [%]
Percent discount	a [−] b [%]
Square	a [x^2]
Square Root	a [$\sqrt{\ }$]
Reciprocal	a [1/x]
Factorial	a [2nd] [x!]
Natural logarithm	a [LN]
Natural antilogarithm	a [2nd][e^x]
Round to the set decimal	a [÷] b [2nd] [*Round*]
Random number	[2nd][*Rand*]
Combinations	a [2nd][$_nC_r$] b
Permutations	a [2nd][$_nP_r$] b
Sine	a [2nd][*SIN*]
Cosine	a [2nd][*COS*]
Tangent	a [2nd][*TAN*]
Arc sine	a [INV][*SIN*]
Arc cosine	a [INV][*COS*]
Arc tangent	a [INV][*TAN*]
Hyperbolic sine	a [2nd][*Hyp*][*SIN*]
Hyperbolic cosine	a [2nd][*Hyp*][*COS*]
Hyperbolic tangent	a [2nd][*Hyp*][*TAN*]
Hyperbolic arcsine	a [2nd][*Hyp*][INV][*SIN*]
Hyperbolic arccosine	a [2nd][*Hyp*][INV][*COS*]
Hyperbolic arctangent	a [2nd][*Hyp*][INV][*TAN*]

Functions	Examples of key combination
Constant calculation	[operator][2nd][*K*] a, or, [operator][2nd][*K*] a [%] (Note: the operator can be +, −, ×, ÷, or y^x. To execute constant calculation, the operator and the number 'a' will be stored.)
Last Answer function	[2nd][*ANS*] (recall the last answer and one can reuse the last answer for further calculation)

e-2. Input Ranges of Scientific Functions :-

Function	Input range
sin x, cos x,tan x	Abs $(x) < 9000000000°$ $(50000000\pi$ radians)
$\sin^{-1}x$, $\cos^{-1}x$	Abs $(x) \leq 1$
$\tan^{-1}x$	Abs $(x) < 10^{100}$
e^x	$-10^{100} < x \leq 230.2585092$
sinh x, cosh x	$x \leq 230.2585092$
tanh x	Abs $(x) < 10^{100}$
$\sinh^{-1} x$	Abs $(x) < 5 \times 10^{99}$
$\cosh^{-1}x$	$1 \leq x < 5 \times 10^{99}$
$\tanh^{-1}x$	Abs $(x) < 1$
ln x	$1 \times 10^{-99} \leq x < 10^{100}$
$\sqrt{x}$	$0 \leq x < 10^{100}$
x^2	Abs $(x) < 10^{50}$
1/x	Abs $(x) \leq 10^{100}$, $x \neq 0$
x !	$0 \leq x \leq 69$ (x is an integer)
x^y	$x > 0 :- -1 \times 10^{100} < y\log x < 100$, $x = 0 :- y > 0$ $x < 0 :- y = n$ or $1/(2n + 1)$ where n = integer

f. Worksheet Operations :-

Worksheet variables are classified as four types, i.e., Enter-only, Compute-only, Automatic-Compute, Enter or Compute.

Enter-Only variables :-

Enter-Only variables can be entered directly from the keypad, or the result of a math calculation, or constant memory content. When Enter-only variables are accessed, 'ENTER' indicator will be ON to remind the user a value should be keyed in. After the value has been input, press [ENTER] to assign the value to the variable. The '=' will be displayed between the label and the value.

Compute-Only variables :-

For Compute-Only variables, no value can be assigned to it. One should press [CPT] during the display of the variable to start the calculation. As the answer is obtained, an '=' sign will be displayed between the label and the value, along with the symbol '*'.

Automatic-Compute variables :-

For automatic-compute variables, [CPT] key needn't be pressed. A value will be computed automatically as the variable is accessed by pressing [↑] or [↓]. After the value is automatically computed, an '=' sign is displayed between the label and the value, along with the symbol '*'.

Enter or Compute variables :-

When an Enter-or-Compute variable is accessed, both the indicators 'COMPUTE' and 'ENTER' will be ON. Either a value can be assigned to the variable by keying in the value and pressing [ENTER], or the [CPT] key can be pressed to compute the value. After [ENTER] or [CPT]

has been pressed, an '=' sign will be displayed between the label and the value.

Below is description for different worksheets. Two decimal places are specified for the following calculation examples.

f-1. TVM Worksheet :-

The followings are key / key sequence involved in TVM worksheet calculation to access the variables or parameters.

Key/Key sequence		Label Meaning	Type of variable
[N]	N	Number of periods	Enter/Compute
[I/Y]	I/Y	Interest rate / year	Enter/Compute
[PV]	PV	present value	Enter/Compute
[PMT]	PMT	Payment	Enter/Compute
[FV]	FV	Future value	Enter/Compute
[2nd][P/Y]	P/Y	No. of payments per year	Enter/Compute
[↓]	C/Y	No.of compounding periods per year	Enter Only
[2nd][BGN]	END/	End of period payments	Setting
	BGN	Beginning of period payments	

How to enter a value to a variable :-

Enter the value followed by the desired variable key. The value will then be assigned to the variable.

e.g. Set PV to 120,000.00   [1][2][0][0][0][0][PV]

If one wants to reset all the TVM variables, he/she can press [2nd][CLR TVM] to reset N, I/Y, PV, PMT and FV to zero. To restore P/Y and C/Y to 12, press keys in sequence as [2nd][P/Y] [2nd][CLR WORK]. To switch back to end-of-period payment, one can press [2nd][BGN][2nd] [CLR WORK].

How to compute the variable :-

Press [CPT] followed by the desired variable.

To compute PV:-   [CPT][PV]
To compute FV:-   [CPT][FV]
To compute N :-   [CPT][N]
To compute PMT:-   [CPT][PMT]
To compute I/Y :-   [CPT][I/Y]

Working example :-

Using the TVM worksheet to determine the monthly payment on a 30-year mortgage with a loan amount of $120,000.00 and an annual percentage rate of 9.125%.

Assume that beginning of period payment is selected currently.

Clear the TVM variables by keying [2nd] [CLR TVM]

                    0.00

Recall P/Y data by pressing [2nd][P/Y]

ENTER ↑↓

P/Y =   12.00

If the payment per year is different from 12. Enter the value and press [ENTER]. If end-of-period payment is selected, press [2nd] [BGN].

SET   BGN

BGN

Press [2nd][SET] to switch to end-of-period.

SET

END

Press [2nd][QUIT] to exit from 'BGN/END' setting display.

                    0.00

Enter loan amount.
[1][2][0][0][0][0][PV]

PV =   120000.00

Enter interest rate.
[9][•][1][2][5][/Y]

I/Y =   9.13

Enter number of payments.
[3][0][2nd][xP/Y][N]

N =   360.00

Finally, compute the payment by pressing [CPT] [PMT].

PMT =   -976.36

Note: When solving a problem using only four of the five TVM variables, make sure the unused variable is zero.

Formulas for TVM calculation :-

1. $i = e^{(y \ln(x+1))} - 1$

   where $PMT \neq 0$
                $y = C/Y \div P/Y$
                $x = (0.01 \times I/Y) \div C/Y$
                C/Y = compounding periods per year
                P/Y = payment periods per year
                I/Y = interest rate per year

$i = (-FV \div PV)^{(1 \div N)} - 1$ where PMT = 0

If only PV, PMT, FV, and N are known, use the following formula to find i :-

$0 = PV + PMT \times G_i \times (1 - (1+i)^{-N})/i + FV \times (1+i)^{-N}$

   where $G_i = 1 + i$ for beginning-of-period payments
              $G_i = 1$ for end-of-period payments

2. $I/Y = 100 \times C/Y \times (e^{(y \ln(x+1))} - 1)$

   where $x = i$
           $y = P/Y \div C/Y$

3. $N = \ln((PMT \times G_i - FV \times i)/(PMT \times G_i + PV \times i))/\ln(1+i)$

   where $i \neq 0$
   $N = -(PV + FV) \div PMT$
   where $i = 0$

4. $PMT = -i / G_i \times (PV + (PV + FV)/((1+i)^N - 1))$ where $i \neq 0$

   $PMT = -(PV + FV) \div N$ where $i = 0$

5. $PV = (PMT \times G_i / i - FV)/(1+i)^N - PMT \times G_i / i$

   where $i \neq 0$
   $PV = -(FV + PMT \times N)$ where $i = 0$

6. $FV = (PMT \times G_i / i) - (1+i)^N \times (PV + PMT \times G_i / i)$

   where $i \neq 0$
   $FV = -(PV + PMT \times N)$ where $i = 0$

---

f-2. Amortization Worksheet :-

   Amortization worksheet is a prompted worksheet. The user can open the worksheet by pressing [2nd][Amort]. Then press [↓] or [↑] consecutively to access all the other variables.

Key/Key sequence	Label	Meaning	Type of variable
[2nd][Amort]	P1	Starting payment	Enter only
[↓]	P2	Ending payment	Enter only
[↓]	BAL	Balance	Auto-compute
[↓]	PRN	Principal paid	Auto-compute
[↓]	INT	Interest paid	Auto-compute

Working example :-

Use the Amortization worksheet to generate an amortization schedule for the first three years of the loan. Assuming that the first payment is in April in the first year, there are nine payment periods. After that, there are 12 payment periods per year

Let end-of-period payment be selected in TVM worksheet and the old content of P1 is 5. Press [2nd][Amort] to select the Amortization worksheet. P1 will be shown first.

```
          ENTER ↑↓

P1 =               5.00
```

One can clear the worksheet by pressing [2nd] [CLR WORK]. Both P1 and P2 will be set to 1.

```
          ENTER ↑↓

P1 =               1.00
```

Press [↓] to step forward and access next variable P2.

```
          ENTER ↑↓

P2 =               1.00
```

Since there are only nine payment periods in the first year, P2 should be set to '9'.
[9][ENTER]

```
          ENTER ↑↓

P2 =               9.00
```

View first year amortization data by pressing [↓].
[↓]

```
               ↑↓
                     *
BAL =          119,407.4
```

[↓]

```
               ↑↓
                     *
PRN =           - 592.54
```

[↓]

```
               ↑↓
                     *
INT =         - 8,194.70
```

Note :- The balance, principal and the interest are calculated basing on the data obtained in the working example for TVM calculation. Press [↓] again, the unit will return to the first page of the worksheet. P1 will be displayed again.

```
          ENTER ↑↓

P1 =               1.00
```

To calculate the amortization data for the second year, P1 and P2 should be changed to 10 and 21

---

respectively.
[1][0][ENTER]

```
          ENTER ↑↓

P1 =              10.00
```

[↓]

```
          ENTER ↑↓

P2 =              21.00
```

[↓]

```
               ↑↓
                     *
BAL =          118,551.85
```

[↓]

```
               ↑↓
                     *
PRN =           - 855.61
```

[↓]

```
               ↑↓
                     *
INT =         - 10,860.71
```

Calculate the amortization data for the third year, press [↓] to go back to the beginning of the amortization worksheet.

```
          ENTER ↑↓

P1 =              10.00
```

Since there are also 12 payment periods in the third year, the user can simply press [CPT] during the display of P1 and the calculator will

update P1 and P2 automatically to the next 12 periods. That is P1 will become 22 and P3 will be updated to 33.

[CPT]

```
             ENTER ↑↓
   P1 =          22.00
```

[↓]

```
             ENTER ↑↓
   P2 =          33.00
```

[↓]

```
               ↑↓
                      *
   BAL =     117,614.86
```

[↓]

```
               ↑↓
                      *
   PRN =       - 936.99
```

[↓]

```
               ↑↓
                      *
   INT =     - 10,779.33
```

Note :- the principal and the interest are displayed as negative because they are paid out.

f-3. Cash Flow Worksheet :-
In cash flow worksheet, the user can calculate NPV (net present value) and IRR (internal rate

of return).

Key/Key sequence	Label	Meaning	Type of variable
[CF]	CFo	Initial cash flow	Enter-only
[↓]	Cnn*	Amount of nth cash flow	Enter-only
[↓]	Fnn*	Frequency of nth cash flow	Enter-only
[NPV]	I	Discount rate	Enter-only
[↓]	NPV	Net present value	Compute-only
[IRR]	IRR	Internal rate of return	Compute-only

* nn represents the number of the cash flow (C01-C24) or the number of the corresponding frequency (F01 - F24).

How to enter cash flow data :-
Press [CF] to enter cash flow values and frequencies. One can enter the initial cash flow (CFo) plus up to 24 cash flows, each of which can be a unique value. Enter inflows (cash received) as positive and outflows (cash paid out) as negative. To enter multiple consecutive cash flows of the same value, one can enter the value for Fnn (frequency) after the entry of the value for Cnn. The value of Fnn must be an integer not exceeding 9999. If there are no value to be entered for Fnn after the input for Cnn, the corresponding Fnn will be assigned as 1. The 'INS' and 'DEL' indicators in the display let the user know that the [2nd] [INS] and [2nd] [DEL] key sequences are available for him to edit the cash flow data. When a cash flow data is deleted, all the cash flow data followed will be advanced one step forward and vice versa for the function of 'cash flow data insert'.

Working example :-
A company plans to pay $7000 for a new machine. The company would like a 20% annual return on its investment. Over the next six years, the company expects to receive the annual cash flows shown below.

Year	Cash Flow Estimate
1	3000
2 - 5	5000 / year
6	4000

To input the above data into the CF worksheet, the following key sequence is performed.

[CF]

```
             ENTER ↑↓
   CFo =      1,000.00
```

(where 1000 is the old value for CFo)
To clear CF worksheet, one can press [2nd] [CLR WORK] to reset the values of CFo to CF24 and F01 to F24.

[2nd][CLR WORK]

```
             ENTER ↑↓
   CFo =          0.00
```

Then enter the data to the worksheet as below.
[7][0][0][0][±] [ENTER]

```
             ENTER ↑↓
   CFo =      -7,000.00
```

[↓]

```
       ENTER ↑↓      INS
   C01            0.00
```

[3][0][0][0][ENTER]

```
       ENTER ↑↓ DEL INS
                      ◁
   C01 =      3,000.00
```

[↓]

```
       ENTER ↑↓ DEL INS
                      ◁
   F01 =          1.00
```

[↓]

```
       ENTER ↑↓ DEL INS
                      ◁
   C02            0.00
```

[5][0][0][0][ENTER]

```
       ENTER ↑↓ DEL INS
                      ◁
   C02 =      5,000.00
```

[↓]

```
       ENTER ↑↓ DEL INS
                      ◁
   F02 =          1.00
```

Since the same cash flows are estimated for the second to the fifth year, the value '4' can be assigned to F02 for simplicity.

[4][ENTER]

```
       ENTER ↑↓ DEL INS
                      ◁
   F02 =          4.00
```

Proceed to cash flow number CF3 by pressing [↓].

```
       ENTER ↑↓ DEL INS
                      ◁
   C03            0.00
```

Enter the value 4000.

[4][0][0][0][ENTER]

```
        ENTER    ↑↓ DEL INS
                          ◁
C03 =          4,000.00
```

[↓]

```
        ENTER    ↑↓ DEL INS
                          ◁
F03 =              1.00
```

Just leave F03 as one in this example. Now all the data have been input. If at this moment, it is found that the $4000 cash flow value should occur in the second year instead of the sixth year. The data can be edited as follows.
Press [↑] consecutively until C03 is displayed.

```
        ENTER    ↑↓ DEL INS
                          ◁
C03 =          4,000.00
```

Press [2nd][DEL] to reset C03 and F03 data to zero.

```
        ENTER    ↑↓ DEL INS
                          ◁
C03 =              0.00
```

Then move to the second cash flow.
[↑][↑]

```
        ENTER    ↑↓ DEL INS
                          ◁
C02 =          5,000.00
```

Insert the new second cash flow.
[2nd][INS]

```
        ENTER    ↑↓ DEL INS
                          ◁
C02 =              0.00
```
25

Key in the amount 4000.
[4][0][0][0][ENTER]

```
        ENTER    ↑↓ DEL INS
                          ◁
C02 =          4,000.00
```

[↓]

```
        ENTER    ↑↓ DEL INS
                          ◁
F02 =              1.00
```

Finally, move to next cash flow to verify data. The original C02 and F02 data should now be shifted down to C03 and F03.
[↓]

```
        ENTER    ↑↓ DEL INS
                          ◁
C03 =          5,000.00
```

[↓]

```
        ENTER    ↑↓ DEL INS
                          ◁
F03 =              4.00
```

To compute the net present value using an interest rate per period I of 20%, one can press [NPV] to start the calculation. The label 'I' will be displayed. And the user is prompted to enter the interest rate per period.
[NPV]

```
                    ENTER  ↑↓

I   =
```

Enter the interest rate as 20%.
26

[2][0][ENTER]

```
                    ENTER  ↑↓

I   =              2 0.0 0
```

Press [↓] to access the data NPV.

```
                    COMPUTE  ↑↓

NPV =              0.00
```

Press [CPT] to get the answer.

```
                    COMPUTE  ↑↓
                              *
NPV =          7,266.44
```

To calculate the internal rate of return (IRR).
Press [IRR]

```
                    COMPUTE

IRR =              0.00
```

Followed by the key [CPT] to obtain the answer.

```
                    COMPUTE
                              *
IRR =             52.71
```

Formulas used for Cash Flow Calculation :-

$$NPV = CF_0 + \sum_{j=1}^{N} CF_j / (1+i)^j$$

where $i = I/Y \div 100$
Net present value is dependent on the values of the initial cash flow, subsequent cash flows and the specified interest rate.

IRR = i such that NPV = 0
Internal rate of return is dependent on the values of the initial cash flow and sub-sequent cash flows.
27

f-4.Bond Worksheet :-
To open the Bond worksheet, press [2nd][Bond]. The following variables can be accessed.

Label	Meaning	Type of variable
SDT	Settlement date	Enter-only
CPN	Annual coupon rate in percent	Enter-only
RDT	Redemption date	Enter-only
RV	Redemption value (percentage of par value)	Enter-only
ACT	Actual/actual day-count method	Setting
360	30/360 day-count method	Setting
2/Y	Two coupons per year	Setting
1/Y	One coupon per year	Setting
YLD	Yield to redemption	Enter / Compute
PRI	Dollar price	Enter / Compute
AI	Accrued interest	Auto-compute

At entering the Bond worksheet, pressing [2nd] [CLR WORK] sets RV to 100 and CPN, YLD and PRI to zero. But SDT, RDT, day-count method and coupon frequency are not affected and will be kept at the current setting. If you have not entered the necessary values, an error occurs when you press [↑] or [↓] to move through the worksheet.

Working example :-
Suppose you want to purchase a semiannual corporate bond that matures on 12/31/91 to settle on 6/12/90. The bond is based on the 30/360 day-count method with a coupon rate of 7%. It will be redeemed at 100% of its par value. For an 8% yield to maturity, compute the bond's price and the accrued interest.
Assuming that :- SDT is currently set at 12/31/90
    U.S date format is selected.
    Day-count method is set at ACT.
28

Select the Bond worksheet first by pressing [2nd][*Bond*]

```
              ENTER ↑↓
    SDT = 12 – 31 – 1990
```

Enter the settlement date as 6/12/90. [6][•][1][2][9][0][ENTER]

```
              ENTER ↑↓
    SDT =  6 – 12 – 1990
```

Press [↓] to access next values. Now it comes to show annual coupon rate.

```
              ENTER ↑↓
    CPN =            0.00
```

Set it to 7%. Press [7][ENTER].

```
              ENTER ↑↓
    CPN =            7.00
```

Press [↓] to display redemption date RDT.

```
              ENTER ↑↓
    RDT = 12 – 31 – 1990
```

Redemption date is set at 12/31/91. Hence, key in [1][2][•][3][1][9][1][ENTER].

```
              ENTER ↑↓
    RDT =  12 – 31 – 1991
```

Press [↓] to proceed to redemption value setting.

```
              ENTER ↑↓
    RV =          100.00
```

Leave it at 100 and press [↓] again.

```
              SET ↑↓
    ACT
```

Press [2nd][*SET*] to switch to 30/360 day-count method.

```
              SET ↑↓
    360
```

Go on pressing [↓].

```
              SET ↑↓
    2/Y
```

Needn't to change coupon frequency. Just press [↓] again.

```
         COMPUTE ENTER ↑↓
    YLD =            0.00
```

Key in [8][ENTER].

```
         COMPUTE ENTER ↑↓
    YLD =            8.00
```

Finally, press [↓] to come to the display of PRI.

```
         COMPUTE ENTER ↑↓
    PRI =            0.00
```

Press [CPT] to calculate the dollar price.

```
         COMPUTE ENTER ↑↓
                         *
    PRI =           98.56
```

Press [↓] to view the accrued interest.

```
                   ↑↓
                         *
    AI  =            3.15
```

Formulae used in Bond worksheet calculation :-

Let PRI = dollar price per $100 par value

RV   = redemption value of the security per $100 par value

R   = annual interest rate (CPN ÷ 100)

M   = number of coupon periods per year

DSR = number of days from settlement date to redemption date (maturity date, call date or put date, etc.)

E   = number of days in coupon period in which the settlement date falls

Y   = annual yield on investment with security held to redemption (YLD ÷ 100)

A   = number of days from beginning of coupon period to settlement date (accrued days)

N   = number of coupons payable between settlement date and redemption date (if this number contains a fraction, raise it to the next whole number, e.g., set N to 3 if it is found as 2.4)

DSC = number of days from settlement date to next coupon date

K   = summation counter

1. Dollar price with one coupon period or less to redemption :-

$$PRI = (RV + 100 \times R/M)/(1 + (DSR/E \times Y/M)) - (A/E \times 100 \times R/M)$$

Note :- The first term calculated the present value of the redemption amount, including interest, based on the yield for the invested period. The second term calculates the accrued interest agreed to be paid to the seller.

2. Yield with one coupon period or less to redemption :-

$$YLD = ((RV/100 + R/M) - (PRI/100 + (A/E \times R/M))) / (PRI/100 + (A/E \times R/M)) \times (M \times E/DSR)$$

3. Dollar price with more than one coupon period to redemption :-

$$PRI = RV/(1 + Y/M)^{N-1+DSC/E} + \sum_{K=1}^{N} (100 \times R/M/(1 + Y/M)^{K-1+DSC/E}) - 100 \times R/M \times A/E$$

Note:- The first term calculates the present value of the redemption amount, not including interest. The second term calculates the present values for all future coupon payments. The third term calculates the accrued interest agreed to be paid to the seller.

4. Yield with more than one coupon period to redemption :-

YLD is found through an iterative search process using the formula 3 shown above.

5. Accrued interest for securities with standard coupons or interest at maturity:-

$$AI = PAR \times R/M \times A/E$$

where PAR = par value i.e. principal amount to be paid at maturity

f-5. Depreciation worksheet :-

To access the Depreciation worksheet, press

[2nd][*Depr*]. Then choose a depreciation method, enter the known values and compute the unknown values. To choose a depreciation method, press [2nd][*SET*] repeatedly at entering the worksheet until the desired method is displayed. To view the variables, press [↑] or [↓].

Below show all the settings and variables to be accessed in Depreciation worksheet.

Label	Meaning	Type of variables
SL	Straight line method	Setting
SYD	Sum-of-the-years'-digits method	Setting
DB	Declining-balance method	Setting / Enter
DBX	DB method with crossover to SL	Setting / Enter
LIF	Life of the asset in years Note:-For SL method, LIF must be a positive real number. For other three methods, LIF must be a positive integer	Enter-only
M01	Starting month	Enter-only
CST	Cost of the asset	Enter-only
SAL	Salvage value of the asset	Enter-only
YR	Year to compute (must be a positive integer)	Enter-only
DEP	Depreciation for the year	Auto-compute
RBV	Remaining book value at the end of the year	Auto-compute
RDV	Remaining depreciable value	Auto-compute

Working example :-

In mid-May, a company begins to depreciate a machine with a seven-year life and no salvage value. The machine cost is $100,000.

DBX method is to be used to compute the depreciation expense, remaining book value, and remaining depreciable value for the first two years. The declining balance percent is 200.

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Press [2nd][*Depr*] to access the Depreciation worksheet.

```
          SET ↑↓

   SL
```

One can press [2nd][*CLR WORK*] to set LIF, M01 and YR to 1, and reset CST and SAL to zero. Press [2nd][*SET*] repeatedly until DBX is shown. Let the current DB% be set at 200.

```
       ENTER SET ↑↓

 DBX =            200.00
```

Then input life in years by entering the key sequence [↓] [7] [ENTER].

```
        ENTER  ↑↓

 LIF =             7.00
```

Press [↓][5][•][5][ENTER] to enter the starting month.

```
        ENTER  ↑↓

 MO1 =             5.50
```

Enter the cost by key sequence [↓][1][0][0][0][0][0][ENTER].

```
        ENTER  ↑↓

 CST =        100,000.00
```

Press [↓] to access the salvage value SAL.

```
        ENTER  ↑↓

 SAL =             0.00
```

Leave it at zero since no salvage value is estimated.

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Press [↓] to access the last data input YR and assign '1' to it.

[↓][1][ENTER]

```
        ENTER  ↑↓

 YR  =             1.00
```

The consecutive pressings of [↓] will let the user view the depreciation amount, remaining book value and remaining depreciable value.

[↓]

```
             ↑↓
                  *
 DEP =         17,857.14
```

[↓]

```
             ↑↓
                  *
 RBV =         82,142.86
```

[↓]

```
             ↑↓
                  *
 RDV =         82,142.86
```

Pressing [↓] again will return to the display of YR. Press [CPT] to increment YR by 1 and the depreciation schedule data for the next year can be viewed.

[CPT]

```
        ENTER  ↑↓

 YR  =             2.00
```

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[↓]

```
             ↑↓
                  *
 DEP =         23,469.39
```

[↓]

```
             ↑↓
                  *
 RBV =         58,673.47
```

[↓]

```
             ↑↓
                  *
 RDV =         58,673.47
```

Formulae used in Depreciation worksheet :-

Let $FSTYR = (13 - MO1) \div 12$ in the following formulae.

1. $RDV = CST - SAL - \text{accumulated depreciation}$
2. $RBV = CST - \text{accumulated depreciation}$
3. For SL method,

   $Depreciation = (CST - SAL) \div LIF$

   First year :- $(CST - SAL)/LIF \times FSTYR$

   Last year or more :- $DEP = RDV$

4. For SYD method :-

   $Depreciation = (LIF + 2 - YR - FSTYR) \times (CST - SAL) / ((LIF \times (LIF + 1)) \div 2)$

   First year :- $LIF \times (CST - SAL)/((LIF \times (LIF + 1)) \div 2) \times FSTYR$

   Last year :- $DEP = RDV$

5. For DB and DBX method :-

   $Depreciation = RBV \times (DB\%/100) \div LIF$

   where RBV is for $YR - 1$

   For the first year :- $CST \times (DB\%/100) \div LIF \times FSTYR$

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unless CST × (DB % /100)÷LIF×FSTYR>

RDV;then use RDV × FSTYR

If DEP > RDV, use DEP = RDV

Last year :- DEP = RDV

f-6.Statistics Worksheet

The statistical functions simplify a wide variety
of commonly used statistical operations.
At entering of Statistical worksheet,one can
choose a statistics calculation method and
compute results. The statistics methods include
One variable statistics (1-V), Power regression
(PWR), Exponential regression (EXP),
Logarithmic regression (Ln) and Standard
linear regression (LIN). Press [2nd][STAT] to
select the Statistics worksheet. The current
statistics method will be displayed. Say the
current method is LIN.

```
                          SET  ↑↓

  LIN
```

If another statistics method is needed, press
[2nd][SET] repeatedly until the display of the
desired method. Then one can press [↓] to do the
computation for the following items.

LABEL	Meaning	Type of item
n	Number of observations	Auto-compute
x	Mean of X values	Auto-compute
Sx	Sample standard deviation of X	Auto-compute
δx	Population standard deviation of X	Auto-compute
y **	Mean of Y values	Auto-compute
Sy **	Sample standard deviation of Y	Auto-compute
δy **	Population standard deviation of Y	Auto-compute
a **	Linear regression (y-intercept)	Auto-compute
b **	Linear regression (slope)	Auto-compute
r **	Correlation coefficient	Auto-compute
X' **	Predicted X value	Enter / Compute
Y' **	Predicted Y value	Enter / Compute
Σx	Sum of X values	Auto-compute
Σx²	Sum of X squared values	Auto-compute
Σy **	Sum of Y values	Auto-compute
Σy² **	Sum of Y squared values	Auto-compute
Σxy **	Sum of XY products	Auto-compute

Note :- the items marked with ** are not available
for 1-V statistics method

Formulas used for statistical calculations :-

1.Standard deviation

$$Sx = \sqrt{((\Sigma x^2 - (\Sigma x)^2/n)/n)}$$

2.Population deviation

$$\delta x = \sqrt{((\Sigma x^2 - (\Sigma x)^2/n)/n-1)}$$

3.Mean

$$x = \Sigma x / n$$

4.For regression formula $y = a + bx$

$$a = (\Sigma y - b \times \Sigma x)/n$$

$$b = (n \times \Sigma xy - \Sigma x \times \Sigma y)/(n\Sigma x^2 - (\Sigma x)^2)$$

Estimated values of X' and Y' are calculated
using the formula above.

5.Correlation coefficient

$$r = (n \times \Sigma xy - \Sigma x \times \Sigma y)/\sqrt{((n\,\Sigma x^2 - (\Sigma x)^2)}$$
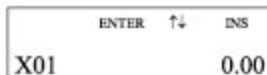$$\times (n\Sigma y^2 - (\Sigma y)^2))$$

Working example :-

How to input x,y data for statistics calculation
Press [2nd][DATA] to open the data worksheet.
Totally, 30 data points can be stored. At the
entering of data worksheet, X01 will be
displayed along with the previous value.
Say, X01 = 5.5.

```
            ENTER    ↑↓  DEL INS

  X01 =               5.50
```

One can press [2nd][CLR WORK] to clear
the worksheet

```
            ENTER    ↑↓    INS

  X01                 0.00
```
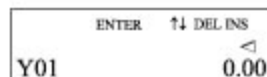
The following example shows how to enter the
five (x,y) data points and calculate the respective
quantities.

Temperature/°C	Length of the steel bar/mm
10	1003
15	1005
20	1010
25	1011
30	1014

Enter X01 first. [1][0][ENTER]

```
            ENTER    ↑↓ DEL INS
                             ◁
  X01 =              10.00
```

Press [↓] to proceed to the entry of the respective
Y-data.

```
            ENTER    ↑↓ DEL INS
                             ◁
  Y01                 0.00
```

Enter [1][0][0][3][ENTER]

```
            ENTER    ↑↓ DEL INS
                             ◁
  Y01 =           1,003.00
```

Go on entering the other four data points.
[↓][1][5][ENTER]

```
            ENTER    ↑↓ DEL INS
                             ◁
  X02 =              15.00
```

[↓][1][0][0][5][ENTER]

```
            ENTER    ↑↓ DEL INS
                             ◁
  Y02 =           1,005.00
```

[↓][2][0][ENTER]

```
            ENTER    ↑↓ DEL INS
                             ◁
  X03 =              20.00
```

[↓][1][0][1][0][ENTER]

```
            ENTER    ↑↓ DEL INS
                             ◁
  Y03 =           1,010.00
```
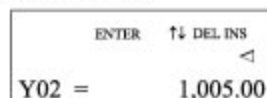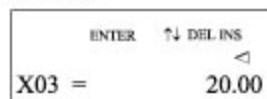
[↓][2][5][ENTER]

ENTER	↑↓ DEL INS
	◁
X04 =	25.00

[↓][1][0][1][2][ENTER]

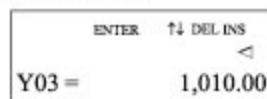| ENTER	↑↓ DEL INS
	◁
Y04 =	1,012.00

[↓][3][0][ENTER]

ENTER	↑↓ DEL INS
	◁
X05 =	30.00

[↓][1][0][1][4][ENTER]

ENTER	↑↓ DEL INS
	◁
Y05 =	1,014.00

At this moment, the user finds that he has made a mistake in Y04.

[↑][↑]

ENTER	↑↓ DEL INS
	◁
Y04 =	1,012.00

Then press [2nd][DEL] to delete the data point (X04, Y04).

ENTER	↑↓ DEL INS
	◁
Y04 =	0.00

41

Now the original data point (X05,Y05) has been shifted upwards. One can view by pressing [↓].

ENTER	↑↓ DEL INS
	◁
X04 =	30.00

[↓]

ENTER	↑↓ DEL INS
	◁
Y04 =	1,014.00

Move back to X04 to insert the original 4th data point (25, 1011)

[↑]

ENTER	↑↓ DEL INS
	◁
X04 =	30.00

Press [2nd][INS].

ENTER	↑↓ DEL INS
	◁
X04 =	0.00

Enter the value 25
[2][5][ENTER]

ENTER	↑↓ DEL INS
	◁
X04 =	25.00

Then input Y04.
[↓][1][0][1][1][ENTER]

ENTER	↑↓ DEL INS
	◁
Y04 =	1,011.00

42

Go on pressing [↓] to check the data point (X05, Y05).

ENTER	↑↓ DEL INS
	◁
X05 =	30.00

[↓]

ENTER	↑↓ DEL INS
	◁
Y05 =	1,014.00

Note :- For One-Variable statistics method, the data Y is defaulted as 1 and it stands for number of times the X-value occurs. One can enter a value to Y if the frequency of X is not 'one'.

Now, we can press [2nd][STAT] to move to the statistical calculation portion of the Statistics worksheet. The most recently selected statistics calculation method is displayed. Say, 1-V is the current method.

SET ↑↓
1-V

Press [2nd][SET] repeatedly till the statistics calculation method desired is displayed. In this example, LIN is selected.

SET ↑↓
LIN

Press [↓] to begin computing results.
[↓]

↑↓
*
n = 5.00

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[↓]

↑↓
*
x̄ = 20.00

[↓]

↑↓
*
Sx = 7.91

[↓]

↑↓
*
σx = 7.07

[↓]

↑↓
*
ȳ = 1008.60

[↓]

↑↓
*
Sy = 4.51

[↓]

↑↓
*
σy = 4.03

[↓]

↑↓
*
a = 997.40

[↓]

↑↓
*
b = 0.56

44

		↑↓
		*
r	=	0.98

[↓]

COMPUTE ENTER	↑↓
X' =	0.00

Enter the value for X 'and find Y'.
[1][8][ENTER]

COMPUTE ENTER	↑↓
X' =	18.00

[↓][CPT]

COMPUTE ENTER	↑↓
	*
Y' =	1,007.48

[↓]

	↑↓
	*
ΣX =	100.00

[↓]

	↑↓
	*
ΣX² =	2,250.00

[↓]

	↑↓
	*
ΣY =	5,043.00

[↓]

	↑↓
	*
ΣY² =	5,086,451.00

[↓]

	↑↓
	*
ΣXY =	101,000.00

For One Variable statistics method, only n, mean of x, Sx, σx, Σx and Σx² can be viewed through pressings of [↓].

f-7. Percent Change / Compound Interest Worksheet :-

To access the Percent Change/Compound Interest worksheet, press [2nd][⊲%]. This worksheet is used to find the percentage increase or decrease between two values, or compute a value when one value and the percent change between two values are known. It is also possible to compute the compound interest and do cost-sell-markup calculations.

Variables to be accessed in the worksheet are as follows :-

Label	Meaning	Type of variables
OLD	Old value	Enter / Compute
NEW	New value	Enter / Compute
% CH	Percent change	Enter / Compute
#PD	Number of periods	Enter / Compute

Case 1 --- For percent change calculations
Formula :- NEW = OLD × (1 + CH% / 100)
(note :- set #PD = 1)
Working example :-
Determine the percentage change from a forecast amount of $658 to an actual amount of $700.

Then determine what the new amount would be if it were 7% below the original forecast. Press [2nd][⊲ %] to enter the worksheet. The current value of 'OLD' will be shown. One can press [2nd][CLR WORK] to clear OLD, NEW and %CH to zero and set #PD at 1.

COMPUTE ENTER	↑↓
OLD =	0.00

Enter the value 658 by key sequence [6][5][8] [ENTER]

COMPUTE ENTER	↑↓
OLD =	658.00

Enter the NEW value 700.
[↓][7][0][0][ENTER]

COMPUTE ENTER	↑↓
NEW =	700.00

Compute the percent change by keying [↓][CPT]

COMPUTE ENTER	↑↓
%CH =	6.38

Enter -7 as the percent change by keying [7][±] [ENTER].

COMPUTE ENTER	↑↓
%CH =	- 7.00

Step back to the page with NEW shown then press [CPT].

[↑][CPT]

COMPUTE ENTER ↑↓
*
NEW = 611.94

Case 2 :- For compound interest calculation
Formula :- NEW = OLD × (1 + CH% /100)^PD
Working example :-
Some stock was purchased for $ 500 in 1985. And it was sold for $750 five years later. What was the annual growth rate ?
Press [2nd][⊲ %] to enter the worksheet. The current value of 'OLD' will be shown One can press [2nd][CLR WORK] to clear OLD, NEW and %CH to zero and set #PD at 1.

COMPUTE ENTER ↑↓
OLD = 0.00

Enter the value 500 by key sequence [5][0][0] [ENTER]

COMPUTE ENTER ↑↓
OLD = 500.00

Then enter the NEW value and the number of years.
[↓] [7] [5] [0] [ENTER]

COMPUTE ENTER ↑↓
NEW = 750.00

[↓][↓][5][ENTER]

COMPUTE ENTER ↑↓
#PD = 5.00

Move one step backward to calculate the annual growth rate.
[↑][CPT]

COMPUTE ENTER ↑↓	
%CH =	8.45

Case 3 :- For cost-sell-markup calculation
Formula :- NEW = OLD × (1 + %CH / 100)
The operating procedure is the same as Case 1.
#PD value should be kept at 1.

f-8. Interest Conversion Worksheet :-
Press [2nd][*I CONV*] to access the Interest Conversion worksheet. This worksheet is useful for converting between nominal interest rate (NOM) and annual effective interest rate (EFF).

Variables available in the worksheet :-

Label	Meaning	Type of variable
NOM	Nominal rate	Enter / Compute
EFF	Annual effective rate	Enter / Compute
C/Y	Compounding periods / year	Enter-only

Formula used :

$1 + EFF\% = (1 + NOM/ C/Y \%)^{C/Y}$

Working example :-
A bank is offering a certificate that pays a nominal interest rate of 15% with quarterly compounding. What is the annual effective interest rate ?
One can press [2nd][*I CONV*] to enter the worksheet. Then he/she can reset the values of NOM and EFF by keying [2nd][*CLR WORK*].

COMPUTE ENTER ↑↓	
NOM =	0.00

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Enter the nominal rate 15% by keying in [1][5] [ENTER]

COMPUTE ENTER ↑↓	
NOM =	15.00

Enter the number of compounding periods per year.
[↓][↓][4][ENTER]

ENTER ↑↓	
C/Y =	4.00

Then restore the display of EFF and press [CPT].
[↑][CPT]

COMPUTE ENTER ↑↓	
EFF =	15.87

f-9. Date Worksheet
Press [2nd][*Date*] to access the Date Worksheet. This worksheet can be used to find the number of days between two dates.
The following variable can be accessed in the worksheet.

Label	Meaning	Type of variable
DT1	Date 1	Enter / Compute
DT2	Date 2	Enter / Compute
DBD	Days between dates	Enter / Compute
ACT, or	Actual/Actual day-count method	Setting
360	30/360 day-count method	Setting

Working example
A loan is made on January 4, 1990, but the first payment is deferred until March 1, 1990. How many days does the loan accrue interest before the first payment ?

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Press [2nd][*Date*] to select the Date worksheet. One can press [2nd][*CLR WORK*] to clear the worksheet. DT1 and DT2 will be restored to Dec 31, 1990 and DBD reset to zero.

COMPUTE ENTER ↑↓	
DT1 = 1 2 – 3 1 – 9 0	

Enter the first date as Jan 4, 1990 by the key sequence [1][•][0][4][9][0][ENTER].

COMPUTE ENTER ↑↓	
DT1 = 1 – 0 4 – 9 0	

Then enter the second date by a series of key pressing [↓][3][•][0][1][9][0][ENTER].

COMPUTE ENTER ↑↓	
DT2 = 3 – 0 1 – 9 0	

Press [↓] twice to check the day-count method. If the current selection is 30/360 day-count method, the display will be

SET ↑↓	
360	

Press [2nd][*SET*] to switch to ACT day-count method.

SET ↑↓	
ACT	

Then go back to the DBD page and do the computation. For this example, the calculation will base on the actual days of each month in the period. If 30/360 is selected, the calculator will count 30 days for each month.

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COMPUTE ENTER ↑↓	
DBD =	56.00

f-10. Profit Margin Worksheet
To access the Profit Margin worksheet, press [2nd][*Profit*]. This worksheet is for solving cost, selling price or profit margin. The user can enter values for any two variables and compute the value for the third variable.

Variables to be accessed in this worksheet :-

Label	Meaning	Type of variable
CST	Cost	Enter / Compute
SEL	Selling price	Enter / Compute
MAR	Profit margin	Enter / Compute

Formula used in this worksheet :-
Profit margin MAR = (SEL − CST)/SEL × 100%

Working example
The selling price of an item is $125. The gross profit margin is 20%. Find the original cost.

Press [2nd][*Profit*] to select Profit Margin worksheet. The current value for CST will be displayed. One can press [2nd][*CLR WORK*] to clear the worksheet. All the variables such as CST, MAR and SEL will be reset to zero.

COMPUTE ENTER ↑↓	
CST =	0.00

Go on entering the value for SEL and MAR.
[↓][1][2][5][ENTER]

COMPUTE ENTER ↑↓	
SEL =	125.00

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[↓][2][0][ENTER]

```
     COMPUTE ENTER   ↑↓
MAR =              20.00
```

Finally, move back to the beginning of the worksheet to compute the cost.
[↑][↑][CPT]

```
     COMPUTE ENTER   ↑↓
                          *
CST =             100.00
```

f-11. Breakeven worksheet

Press [2ⁿᵈ][*Brkevn*] to select the Breakeven worksheet. This worksheet is used for finding the breakeven point and sales level necessary to earn a given level of profit. Below are variables to be accessed in this worksheet :-

Label	Meaning	Type of variable
FC	Fixed cost	Enter / Compute
VC	Variable cost per unit	Enter / Compute
P	Unit price	Enter / Compute
PFT	Profit	Enter / Compute
Q	Quantity	Enter / Compute

Working example :-

A canoe company sells paddles for $20 each. The unit variable cost is $15, and the fixed costs are $3000. How many paddles must be sold to break even?

Press [2ⁿᵈ][*Brkevn*] to select the Breakeven worksheet. The current value for FC will be displayed. One can press [2ⁿᵈ][*CLR WORK*] to clear the worksheet. That is to reset all variables FC, VC, P, PFT and Q to zero.

```
     COMPUTE ENTER   ↑↓
FC =                0.00
```

Assign the value 3000 to FC.
[3][0][0][0][ENTER]

```
     COMPUTE ENTER   ↑↓
FC =            3,000.00
```

Press [↓] to move to the next variable VC and enter 15.

```
     COMPUTE ENTER   ↑↓
VC =               15.00
```

Enter the price as well.
[↓][2][0][ENTER]

```
     COMPUTE ENTER   ↑↓
P  =               20.00
```

Further pressing of [↓] will show the page for profit P. For breakeven condition, PFT should be set at zero.

```
     COMPUTE ENTER   ↑↓
PFT =               0.00
```

Finally, it comes to the last variable which is to be computed.

[↓][CPT]

```
     COMPUTE ENTER   ↑↓
                          *
Q  =              600.00
```

f-12. Memory Worksheet

Memory worksheet gives the user visual access to all the calculator's ten constant memories. It provides an easy way to execute memory storing and recall. All the variables to be accessed in this worksheet are those ten memories. There are

no formulas, no settings and no value to compute.

Label	Meaning	Type of variable
M0	Memory 0	Enter-only
M1	Memory 1	Enter-only
M2	Memory 2	Enter-only
M3	Memory 3	Enter-only
M4	Memory 4	Enter-only
M5	Memory 5	Enter-only
M6	Memory 6	Enter-only
M7	Memory 7	Enter-only
M8	Memory 8	Enter-only
M9	Memory 9	Enter-only

To select the Memory worksheet, one should press [2ⁿᵈ][*MEM*]. To clear all of the memories at once, simply press [2ⁿᵈ][*CLR WORK*] to clear the worksheet. As the worksheet has been selected, the Memory 0 will be displayed. The user can store a value to it by keying in the number followed by key [ENTER]. Repeated pressing of [↓] or [↑] will show the memories one by one. Besides storing a number directly to the memory shown on the display, the user can execute Memory Plus, Memory Minus, Memory Times and Memory Divide functions by key sequence of [operator key], the number, then [ENTER] key.

For example, to add 95 to the memory 9. First locate the memory 9 by the use of [↑] or [↓]. Then key in [+][9][5][ENTER] to add 95 to the content of memory 9.

V. Error conditions :-

The calculator reports error conditions by displaying the message Error n, where n is the number of the error. During error condition, the user has to enter [CE/C] to reset the error.

Below is the description of each error condition.

Error 1 :- Overflow error

Possible causes :-

- Attempted calculation whose result is outside the range of the calculator, i.e. absolute value $\geq 1 \times 10^{99}$
- Attempted to divide by zero.

Error 2 :- Invalid Argument

Possible causes :-

- Attempted to calculate x! when x is not an integer from zero through 69.
- Attempted to calculate LN of x when $x \leq 0$
- Attempted to calculate y^x when y < 0 and x is not an integer of the inverse of an integer
- Attempted to calculate $\sqrt{x}$ when x is < 0.
- In Amortization worksheet, attempted to compute BAL, PRN, and INT when P2 < P1.
- In Depreciation worksheet, attempted a calculation when SAL > CST.

Error 3 :- Too many pending operations

Possible causes :-

- Attempted to use more than 15 active levels of parentheses.
- Attempted to use more than 8 pending operations.

Error 4 :- Out of range

Possible causes :-

- In Amortization worksheet, attempted to enter a value for P1 or P2 that is outside the range 1-9999.
- In TVM worksheet, attempted to enter a value for P/Y or C/Y that is ≤ 0.
- In Cash Flow worksheet, attempted to enter a value for Fnn (frequency) that is outside the range 1 - 9999.
- In Bond worksheet, attempted to enter a value for RV or CPN that is less than zero.
- In Bond worksheet, attempted to enter a value for PRI ≤ 0.

- In Date worksheet, attempted to compute a date that is outside the range Jan. 1, 1950 through Dec. 31, 2049.
- In Depreciation worksheet, attempted to enter a value for declining balance percent ≤ 0, for LIF ≤ 0, for CST < 0, for SAL < 0, for YR ≤ 0, or MO1 < 1 or MO1 ≥ 13.
- In Interest Conversion worksheet, attempted to enter a value for C/Y ≤ 0.
- After pressing [2nd][*Format*], attempted to enter a value for DEC that is outside the range 0 - 9.

Error 5 :- No solution exists

Possible causes :-
- In TVM worksheet, attempted to compute I/Y when FV, (N×PMT), and PV all have the same sign.

- In Cash Flow worksheet, attempted to compute IRR without at least one sign change in the cash flow list.

Error 6 :- Invalid date

Possible causes :-
- In Bond or Date worksheets, attempted to enter an invalid date
- In Bond or Date worksheets, attempted to enter a date not matching the format selected.
- In Bond worksheet, attempted a calculation when the redemption date is earlier than or the same as the settlement date.

Error 7 :- Iteration limit exceeded

Possible causes :-
- In TVM worksheet, attempted to compute I/Y for a very complex problem involving many iterations.
- In Cash Flow worksheet, attempted to compute IRR for a complex problem with

multiple sign changes.
- In Bond worksheet, attempted to compute YLD for a very complex problem.

Error 8 :- Cancelled iterative calculation
- During iterative calculation, press [ON/OFF] to stop the iteration process.

Those iteration process include :-
* evaluation of I/Y in TVM worksheet
* evaluation of BAL or INT in Amortization worksheet
* evaluation of IRR in Cash Flow worksheet
* evaluation of YLD in Bond worksheet

* **Replacing the battery**

Either of the following symptoms indicates battery power is low, and that the battery should be replaced.

• Display figures are dim and difficult to read in areas where there is little light available.

• Nothing appears on the display when you press the ON key.

This calculator is powered by Ag13 Type (LR 44x2) button battery.

• **Replacing the battery**

Dim figure on the display of the calculator indicate that battery power is low. Continued use of the calculator when the battery power is low can result in improper operation. Replace the battery as soon as possible when display figures become dim.

• **To replace the battery**
① Press SHIFT OFF to turn off power.
② Remove the screw that holds the battery cover in place and then remove the battery cover.

③ Remove the old battery.
④ Wipe off the sides of new battery with a dry, soft cloth. Load it into the unit with the positive ⊕ side facing up (so you can see it).
⑤ Replace the battery cover and secure it in place with the screw.
⑤ Press ON on turn power on.

* **Auto power off**

Calculator power automatically turns off if you do not perform any operation for about six minutes. When this happens, press ON to power back on.