

Programmable<sup>TI</sup> **58/59**

# Securities Analysis

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Datamath Calculator Museum

Quick Reference Guide



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## CALCULATING NOTES

### Low Battery Indication

If the display flashes erratically, fades out, gives incorrect results or is inconsistent in any way, recharge the battery. Calculator operation can be resumed after several minutes of recharging.

### Algebraic Hierarchy

Operations and functions are performed automatically in following order.

1. Math Functions ( $x^2$ , cos, etc.)
2. Exponentiation ( $y^x$ ) and Roots ( $\sqrt[x]{y}$ )
3. Multiplication, Division
4. Addition, Subtraction
5. Equals

Order applies to each set of parentheses. You can use up to 8 pending operations and 9 open parentheses, except where noted.

### Flashing Display

A display flashing off and on indicates that an invalid key sequence has taken place or that the limits of the display have been exceeded. See Appendix B in *Personal Programming* for possible causes.

## CONVERSIONS

### Angle Formats

**2nd DMS — DEGREES, MINUTES, SECONDS TO DECIMAL DEGREES** — Converts an angle measured in degrees, minutes and seconds to its decimal degrees equivalent. **INV 2nd DMS** reverses this conversion. Also used for time conversions. **Operates on display value only.** Submit 2 digits each for minutes and seconds. Entry and display format is DD.MMSSsss where DD is degrees, MM is minutes, SS is whole seconds and sss is fractional seconds.

### Polar to Rectangular

**R**  $\boxed{x \div t} \oplus \boxed{2nd} \boxed{P \rightarrow R} \rightarrow y; \boxed{x \div t} \rightarrow x$

### Rectangular to Polar

$x \boxed{x \div t} y \boxed{INV} \boxed{2nd} \boxed{P \rightarrow R} \rightarrow \theta; \boxed{x \div t} \boxed{R}$

Only 4 pending operations are available for other uses when using D.MS or Polar/Rectangular conversions.

### Angular Conversions

FROM \ TO	Degrees	Radians	Grads
Degrees		$\times \frac{\pi}{180}$	$\div 0.9$
Radians	$\times \frac{180}{\pi}$		$\times \frac{200}{\pi}$
Grads	$\times 0.9$	$\times \frac{\pi}{200}$	

## STATISTICS

Initialize: **2nd Pgm 1 SBR CLR**

Data Entry:  $x_i \boxed{x \div t} y_i \boxed{2nd} \boxed{\Sigma+}$

Data Entry Removal:  $x_i \boxed{x \div t} y_i \boxed{INV} \boxed{2nd} \boxed{\Sigma+}$

Trendline Data Entry:  $x_1 \boxed{x \div t}, y_1 \boxed{2nd} \boxed{\Sigma+}, y_2 \boxed{2nd} \boxed{\Sigma+}$ , etc.

Trendline Point Removal:  $\boxed{x \div t} \boxed{-} \boxed{1} \boxed{=} \boxed{x \div t} y_i \boxed{INV} \boxed{2nd} \boxed{\Sigma+}$

### Calculations

### Key Sequence

Mean of y-array  
then x-array

**2nd**  $\boxed{\bar{x}}$   
 $\boxed{x \div t}$

Standard Deviation  
(N - 1 Weighting) of y-array  
then x-array  
(N Weighting) of y-array  
then x-array

**INV** **2nd**  $\boxed{\bar{x}}$   
 $\boxed{x \div t}$   
**INV** **2nd** **0p** **11**  $\boxed{\sqrt{x}}$   
 $\boxed{x \div t} \boxed{\sqrt{x}}$

Variance  
(N Weighting) of y-array  
then x-array  
(N - 1 Weighting) of y-array  
then x-array

**2nd** **0p** **11**  
 $\boxed{x \div t}$   
**2nd**  $\boxed{\bar{x}}$   $\boxed{x^2}$   
 $\boxed{x \div t} \boxed{x^2}$

Y-Intercept

**2nd** **0p** **12**

Slope after y-intercept

$\boxed{x \div t}$

Correlation Coefficient

**2nd** **0p** **13**

y' for new x

**2nd** **0p** **14**

x' for new y

**2nd** **0p** **15**

## SPECIAL CONTROL OPERATIONS

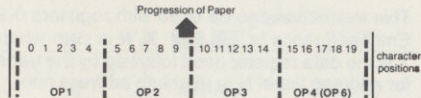
Each special control operation is called by pressing **[2nd]** **[Op]** **nn** where **nn** is the 2-digit code assigned to each operation (short form addressing can be used here). These operations use up to 4 pending operations and 1 sub-routine level.

Code nn	Function
00*	Initialize print register.
01*	Alphanumerics for far left quarter of print column.
02*	Alphanumerics for inside left quarter of print column.
03*	Alphanumerics for inside right quarter of print column.
04*	Alphanumerics for far right quarter of print column.
05*	Print the contents of the print register.
06*	Print last 4 characters of OP 04 with current display.
07*	Plot $\div$ in column 0-19 as specified by the display.
08*	List the labels currently used in program memory.
09	Bring specified library program into program memory.
10	Apply signum function to display register value.
11	Calculate variances.
12	Calculate slope and intercept.
13	Calculate correlation coefficient.
14	Calculate new y prime ( $y'$ ) for an x in the display.
15	Calculate new x prime ( $x'$ ) for a y in the display.
16	Display current partition of memory storage area.
17	Repartition memory storage area.
18	If no error condition exists in a program, set flag 7.
19	If an error condition exists in a program, set flag 7.
20-29	Increment a data register 0-9 by 1.
30-39	Decrement a data register 0-9 by 1.

\*Designed specifically for use with optional PC-100A Print Cradle

## ALPHANUMERIC PRINT CODES

The first seven control operations allow you to create and print out alphanumeric messages. Twenty characters can be printed on each line. They are assembled and stored in groups of 5 characters at a time as shown below.



Each printed character is represented by a two-digit, row-column address code according to the following table:

	0	1	2	3	4	5	6	7
0	0	1	2	3	4	5	6	
1	7	8	9	A	B	C	D	E
2	-	F	G	H	I	J	K	L
3	M	N	O	P	Q	R	S	T
4	.	U	V	W	X	Y	Z	+
5	x	*	Γ	π	e	(	)	,
6	↑	%	↓	/	=	'	x	̄
7	z	?	÷	°	II	△	Π	Σ

For instance, A is code 13 and + is code 47

## PROGRAMMING NOTES

### Labels

Any key on the keyboard can be used as a label except **2nd**, **LRN**, **Ins**, **Del**, **SST**, **BST**, **Ind** and the numbers 0-9.

### DSZ

This instruction can be used with registers 0-9. Entry sequence is **2nd** **DSZ** **X**, **N** or **nnn** where **X** is the data register used followed by the transfer address (label **N** or absolute address **nnn**).

### Flags

Ten flags are available (0-9). Entry sequence for setting, resetting or testing flags is the flag instruction, flag number, then transfer address (testing only).

## MEMORY PARTITIONING

Memory area is partitioned in sets of 10 registers where each register can hold a data value or 8 program instructions. To check placement of current partition, press **2nd** **Op** **16**. To repartition, enter number of sets (**N**) of 10 data registers needed and press **2nd** **Op** **17**.

N	Program/Data	
	TI-58	TI-59
N < 0 = N		
0	479/00	959/00
1	399/09	879/09
2	319/19	799/19
3	<b>239/29*</b>	719/29
4	159/39	639/39
5	079/49	559/49
6	000/59	<b>479/59*</b>
7	Flashing	399/69
8	Flashing	319/79
9	Flashing	239/89
10	Flashing	159/99
N > 10	Flashing	159/99

\*Partition when calculator is turned on.



## PROGRAM KEY CODES

Key Code	Key	Key Code	Key	Key Code	Key
00 ↓	0	39	cos	72*	STO Ind
09	9	40	Ind	73*	RCL Ind
10	E	42	STO	74*	SUM Ind
11	A	43	RCL	75	-
12	B	44	SUM	76	Lbl
13	C	45	$\gamma^*$	77	$\Sigma=$
14	D	47	CMs	78	$\Sigma+$
15	E	48	Exc	79	$\bar{x}$
16	A'	49	Prd	80	Grad
17	B'	50	1x1	81	RST
18	C'	52	EE	83*	GTO Ind
19	D'	53	(	84*	Op Ind
20	CLR	54	)	85	+
22	INV	55	$\div$	86	St. Reg
23	1/x	57	Eng	87	It. Reg
24	CE	58	Fix	88	D. MS
25	CLR	59	Int	89	$\pi$
27	INV	60	Deg	90	List
28	log	61	GTO	91	R/S
29	CP	62*	Pgm Ind	92*	INV SBR
30	tan	63*	Exc Ind	93	.
32	$\Sigma=t$	64*	Prd Ind	94	+/-
33	$\Sigma^2$	65	X	95	=
34	$\sqrt{x}$	66	Pause	96	Write
35	1/x	67	$\Sigma=t$	97	Dsz
36	Pgm	68	Nop	98	Adv
37	P→R	69	Op	99	Pt
38	sin	70	Rnd		
		71	SBR		

\*Merged codes

## RECORDING MAGNETIC CARDS (TI-59 Only)

Display When  
Write Pressed,  
Card Entered

Calculator Response

1, 2, 3, 4

Writes a card side with this number from the bank of this number (program and/or data) and records current partition on card.

-1, -2, -3, -4

Writes and protects card side with this number from the bank with this number. Also records current partition on card.

Any other  
number

Card is passed but not recorded. Rightmost two integer digits of display are flashed.

If the display is flashing any value when trying to read or record a card, the card is passed but not read or recorded and the rightmost two integers in the display are flashed.

The calculator should be in standard display format when reading or recording cards.

Only the integer portion of the display is recognized, i.e., 1.234 = 1.

## READING MAGNETIC CARDS (TI-59 Only)

Display When Card Entered	Calculator Response
0	Reads information into bank number listed on card if current partition matches that on card. If partition incorrect, card is passed, but not read — display flashes card side passed.
1, 2, 3, 4	Expects card with this side number to be read — displays that side number. If another side is entered or if partition is incorrect, card is passed but not read — display flashes card side passed.
-1, -2, -3, -4	Forces side to be read into this bank number regardless of the partition or the number on the card. A protected program cannot be forced into any bank or alternate partition.
Any other number	Card is passed but not read — rightmost two integers in display flash.

## LIBRARY USER INSTRUCTIONS

The remainder of this booklet contains the User Instructions for each program of the library.

### REMOVING AND INSTALLING MODULES.

The library module can easily be removed or replaced with another. It is a good idea to leave the module in place in the calculator except when replacing it with another module. Be sure to follow these instructions when you need to remove or replace a module.

#### CAUTION

*Be sure to touch some metal object before handling a module to prevent possible damage by static electricity.*

1. Turn the calculator OFF. Loading or unloading the module with the calculator ON may cause the keyboard or display to lock out. Also, shorting the contacts can damage the module or calculator.
2. Slide out the small panel covering the module compartment at the bottom of the back of the calculator.
3. Remove the module. You may turn the calculator over and let the module fall out into your hand.
4. Insert the module, notched end first with the labeled side up into the compartment. The module should slip into place effortlessly.
5. Replace the cover panel, securing the module against the contacts.

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
	<b>Diagnostic/Module Check</b>			
A1	Select Program		[2nd] [Pgm] 01	
A2	Run Diagnostic		[SBR] [=]	8. <sup>1,2,3</sup>
	or			
A3	Library Module Check		[SBR] [2nd] [R/S]	8. <sup>2</sup>
	<b>Initialize Linear Regression</b>			
B1	Select Program		[2nd] [Pgm] 01	
B2	Initialize Linear Regression		[SBR] [CLR]	0.

- NOTES:**
1. This output is obtained if the calculator is operating properly.
  2. The number 8. indicates the Securities Analysis Library.
  3. The display will flash if the display is in scientific notation, engineering notation, or fix decimal format when [SBR][=] is pressed. If in doubt, turn the calculator OFF and then ON before running the diagnostic.

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## EARNINGS PER SHARE ESTIMATION

SA-02

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select Program		[2nd] [Pgm] 02	
2	Initialize		[SBR] [CLR]	0.
3	Enter number of years stock is to be held	N	[ A ]	N
4a	Enter Current Sales	S	[ B ]	S
4b	Enter Expected Sales	$S_N$	[R/S]	$S_N$
5a	Enter Current Profit Margin	$\Pi$	[ C ]	$\Pi$
5b	Enter Expected Profit Margin	$\Pi_N$	[R/S]	$\Pi_N$
6a	Enter Current Turnover	T	[ D ]	T
6b	Enter Expected Turnover	$T_N$	[R/S]	$T_N$
7a	Enter Current Leverage	L	[ E ]	L
7b	Enter Expected Leverage	$L_N$	[R/S]	$L_N$
8a	Enter Current Profit on Net Worth	PNW	[2nd] [ A' ]	PNW
8b	Enter Expected Profit on Net Worth	$PNW_N$	[R/S]	$PNW_N$
9a	Enter Current Dividend Pay-Out Ratio	DPO	[2nd] [ B' ]	DPO

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9b	Enter Expected Dividend Pay-Out Ratio	$DPO_N$	[R/S]	$DPO_N$
10	Enter Book/Market Ratio	B/M	[2nd] [ C' ]	B/M
11	Enter Current EPS to find expected EPS	EPS	[2nd] [ E' ]	$EPS_N$

## NOTES:

1. All input and output values are printed and labeled.
2. Profit on Net Worth (PNW) and Dividend Pay-Out Ratio must be entered as numbers less than 1.
3. The remaining variables may be entered in any order of magnitude if like variables are entered using the same magnitude, e.g., if  $S = \$6,000,000$  and  $S_N = 10,500,000$ , S may be entered as 6 provided  $S_N$  is entered as 10.5.
4. All entries are made on an annual basis. The first or "current" entries should be based on the present year. The "expected" entries should be based on the year the investor expects to sell the stock.

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	<b>U.S. Method</b> Select Program		[2nd] [Pgm] 03	
2	Initialize		[SBR] [CLR]	0.
3	Enter 3 of the following in any order <ul style="list-style-type: none"> <li>• Number of Periods</li> <li>• Interest Rate (% per period)</li> <li>• Future Value</li> <li>• Present Value</li> </ul>	N %I FV PV	[A] [B] [C] [D]	N %I FV PV
4	Find the missing term <ul style="list-style-type: none"> <li>• Number of Periods</li> <li>• Interest Rate (% per period)</li> <li>• Future Value</li> <li>• Present Value</li> </ul>		[2nd] [A'] [2nd] [B'] [2nd] [C'] [2nd] [D']	N %I FV PV

- NOTES:**
1. All input and output values are printed and labeled.
  2. [SBR] [CLR] initializes PV and FV to \$1.

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# COMPOUND INTEREST

SA-03

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
	<b>European Method</b>			
1	Select program		[2nd] [Pgm] 03	
2	Initialize		[SBR] [CLR]	0.
	<b>If annual interest rate is known</b>			
3	Solve for $i_{\text{eff}}$ per period			
3A	Enter periods per year	$N_c$	[ A ]	$N_c$
3B	Enter 1 as PV	1	[ D ]	1.00
3C	Enter $(1 + i_{\text{ann}}/100)$ as FV	$1 + i/100$	[ C ]	FV
3D	Solve for $i_{\text{eff}}$ per period		[2nd] [ B' ]	$i_{\text{eff}}$
3E	Enter $i_{\text{eff}}$ per period		[ B ]	$i_{\text{eff}}$
4	Enter two of the following three variables in any order:			
	Number of periods	N	[ A ]	N
	Present value	PV	[ D ]	PV
	Future value	FV	[ C ]	FV
5	Calculate the remaining variable:			
	Number of periods		[2nd] [ A' ]	N
	Present value		[2nd] [ D' ]	PV
	Future value		[2nd] [ C' ]	FV

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	<b>To solve for <math>i_{\text{ann}}</math>, given PV, FV, N</b>			
6	Number of periods	N	[ A ]	N
7	Present value	PV	[ D ]	PV
8	Future value	FV	[ C ]	FV
9A	Solve for $i$ per period		[2nd] [ B' ]	$i(\text{period})$
9B	Enter $i$ per period		[ B ]	$i(\text{period})$
10	Solve for annual interest rate ( $i_{\text{ann}}$ )			
10A	Periods per year ( $N_c$ )	$N_c$	[ A ]	$N_c$
10B	Enter 1 for PV	1	[ D ]	1.00
10C	$FV = 1 + i_{\text{ann}}/100$		[2nd] [ D' ]	$1 + i_{\text{ann}}/100$
10D	Subtract 1 and multiply by 100	1 100	[ - ] [ = ] [ X ] [ = ]	$i_{\text{ann}}$

# ANNUITIES

SA-04

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select Program		[2nd] [Pgm] 04	
2	Initialize		[SBR] [CLR]	0.
3	Select type of problem <ul style="list-style-type: none"> <li>• Sinking Fund</li> <li>• Annuity Due/FV</li> <li>• Ordinary Annuity/PV</li> <li>• Annuity Due/PV</li> </ul>		[2nd] [A'] [2nd] [B'] [2nd] [C'] [2nd] [D']	0. 0. 0. 0.
4	Enter known data in any order <ul style="list-style-type: none"> <li>• Number of Payments</li> <li>• Interest Rate (% per period)</li> <li>• Payment</li> <li>• Present Value or Future Value</li> <li>• Balloon Payment</li> </ul>	N %I PMT PV or FV BAL	[A] [B] [C] [D] [E]	N %I PMT PV or FV BAL
5	Find the missing term <ul style="list-style-type: none"> <li>• Number of Payments</li> <li>• Interest Rate (% per period)*</li> <li>• Payment</li> <li>• Present Value or Future Value</li> <li>• Balloon Payment</li> </ul>		[2nd] [E'] [A] [2nd] [E'] [B] [2nd] [E'] [C] [2nd] [E'] [D] [2nd] [E'] [E]	N %I PMT PV or FV BAL

## NOTES:

1. All input and output values are printed and labeled.
2. [SBR] [CLR] initializes PV and FV to \$1 and the Balloon Payment to 0.
3. Entering or computing a Balloon Payment for Sinking Fund and Annuity Due/FV calculations causes invalid results.
4. If bad data implying impossible situations is entered, the calculation of N may cause a flashing display.
  - \* Relatively long calculation time required.

# UNEVEN CASH FLOWS

SA-05

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select Program		[2nd] [Pgm] 05	
2	Initialize		[SBR] [CLR]	1.
3	Enter Cash Flows <ul style="list-style-type: none"> <li>• If received</li> <li>• If paid</li> </ul> To Change or Correct a Cash Flow Entry <ul style="list-style-type: none"> <li>a) Enter Cash Flow Number</li> <li>b) Enter Cash Flow                             <ul style="list-style-type: none"> <li>• If received</li> <li>• If paid</li> </ul> </li> </ul>	CF CF	[ B ] [ C ]	Next CF No. Next CF No.
4	Enter Investment	INV	[ A ]	INV
5	Compute Internal Rate of Return*		[ D ]	%I
6	Enter %I and compute Present Value	%I	[ E ]	PV
7	Enter %I and compute Future Value	%I	[2nd] [ E' ]	FV

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## NOTES:

1. Input and output values are printed and displayed.
  2. Steps 5, 6, and 7 may be performed in any order.
  3. 19+N registers are required for program use. (N is the number of cash flows.) Repartition if necessary.
- \* Relatively long calculation time required.



STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select Program		[2nd] [Pgm] 06	
2	Initialize		[SBR] [CLR]	1.
3a	Enter Personal Income Tax if desired	Tax	[ A ]	Tax
3b	Enter Capital Gains Tax if desired	CGT	[R/S]	CGT
4	Enter Dividend Payments using one of the following methods:			
I. a)	Enter Expected Growth Rate of Dividends	Growth	[2nd] [ C' ]	Growth
b)	Enter First Dividend Payment	Div	[2nd] [ D' ]	Div
c)	Enter Number of Dividend Payments	N	[R/S]	N + 1
II.	Enter Dividend Payment j (Repeat for j = 1 to N)	Div <sub>j</sub>	[ B ]	j + 1
	To change or Correct a Dividend Entry			
a)	Enter Dividend Number	Div No.	[2nd] [ A' ]	Div No.
b)	Enter Dividend	Div	[2nd] [ B' ]	j + 1

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5	Enter two of the following: <ul style="list-style-type: none"> <li>• Buying Price per Share and Commission per Share</li> <li>• Selling Price per Share and Commission per Share</li> <li>• Interest Rate per Dividend Period</li> </ul>	Buy Com	[ C ] [R/S]	Buy Buy + Com
		Sell Com %I	[ D ] [R/S] [ E ]	Sell Sell - Com %I
6	Find the missing term: <ul style="list-style-type: none"> <li>• Buying Price (Net of Commission)</li> <li>• Selling Price (Net of Commission)</li> <li>• Interest Rate per Dividend Period</li> </ul>		[2nd] [ E' ] [ C ] [2nd] [ E' ] [ D ] [2nd] [ E' ] [ E ]	Buy + Com Sell - Com %I

## NOTES:

1. All input and output values are printed and labeled (Sell and Buy are printed Net of Commissions once entered).
2. If Taxes are to be considered they must be entered before dividends. The dividend payments are then printed net of taxes. (Note that CGT may be entered only after Tax is entered).
3. 19+N registers are required for program use. (N is the number of dividend payments.) Repartition if necessary.

# OPTION VALUATION — BLACK SCHOLES MODEL

SA-07

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select Program		[2nd] [Pgm] 07	
2	Initialize		[SBR] [CLR]	0.
3	Enter Current Price of Stock per Share	Sh Price	[ A ]	Sh Price
4	Enter Exercise Price of Stock per Share	Ex Price	[ B ]	Ex Price
5	Enter Volatility	Vol	[ C ]	Vol
6	Enter Desired Yield	%I	[ D ]	%I
7	Enter Today's Date	MMDD.YYYY	[2nd] [ A' ]	MMDD.YYYY
8	Enter Expiration Date	MMDD.YYYY	[2nd] [ B' ]	MMDD.YYYY
9	If Dividends are to be considered: a) Enter Date of Dividend Payment b) Enter Dividend Payment per Share	MMDD.YYYY Div	[2nd] [ C' ] [R/S]	M.ADD.YYYY PV of Div
10	For Call Options a) Compute Value b) Compute Hedge Ratio		[ E ] [R/S]	Val HR

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11	For Put Options a) Compute Value b) Compute Hedge Ratio		[2nd] [ E' ] [R/S]	Val HR
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- NOTES:**
1. Input and output values are printed and labeled.
  2. A 365 day year is assumed. If a 360 day year is desired, store 360 in  $R_5$  after Step 2. It should be noted, however, that the calculations determine the actual number of days between dates and then divide by the 365 or 360 figure in transforming to annual terms.
  3. Step 9 may be repeated for each dividend payment.

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select Program		[2nd] [Pgm] 08	
2	Initialize		[SBR] [CLR]	0.
3	Enter Number of Options Sold <ul style="list-style-type: none"> <li>• For Calls</li> <li>• For Puts</li> </ul>	N <sub>OPT</sub> N <sub>OPT</sub>	[ A ] [2nd] [ A' ]	N <sub>OPT</sub> N <sub>OPT</sub>
4a	Enter Price per Call or Put	Opt Price	[ B ]	Opt Price
4b	Enter Total Commission on Options in Dollars	Com	[R/S]	Com
5	Enter Exercise Price	Ex Price	[ C ]	Ex Price
6a	Enter Number of Shares Bought or Shorted	N <sub>sh</sub>	[ D ]	N <sub>sh</sub>
6b	Enter Current Price of Stock per Share	Sh Price	[R/S]	Sh Price
7	Enter Average Commission on One Share of Stock as a Percentage of the Share Price	% Com	[ E ]	% Com
8a	Enter Dividends per Share (Optional)	Div	[2nd] [ E' ]	Div
8b	Enter Maintenance Requirement (Optional)	MNT	[R/S]	MNT

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9	Compute Maximum Profit		[2nd] [ B' ]	Max
10a	Compute Investment		[2nd] [ C' ]	Inv
10b	Compute Maximum Return		[R/S]	%I
11a	Compute Upper Break-Even Point		[2nd] [ D' ]	U
11b	Compute Lower Break-Even Point		[R/S]	L

**NOTES:**

- Input and output values are printed and labeled.
- Calculations are valid only when the number of shares bought or shorted is less than the number of puts or calls sold. (See note 3.)
- The number of options sold is entered per 100 calls or puts (e.g., 1 option is 100 calls or puts).
- If a maintenance requirement is to be entered when there are no dividends, enter zero for the dividend payment.

# WARRANT VALUATION

SA-09

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select Program		[2nd] [Pgm] 09	
2	Initialize		[SBR] [CLR]	0.
3	Enter Current Price of Stock per Share	Sh Price	[ A ]	Sh Price
4	Enter Exercise Price	Ex Price	[ B ]	Ex Price
	<b>For Short-Term Warrants:</b>			
5a	Enter C and compute value of warrant	C	[ C ]	Value
5b	Compute Hedge Ratio		[R/S]	HR
	<b>For Long-Term Warrants:</b>			
6	Compute Value of Warrant		[ D ]	Value

- NOTES:**
1. All input and output values are printed and labeled.
  2. C must be greater than 1. (Display flashes invalid C.)

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STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select Program		[2nd] [Pgm] 10	
2	Initialize		[SBR] [CLR]	0.
3	Enter any four of the following: <ul style="list-style-type: none"> <li>Enter Number of Periods to Maturity</li> </ul> OR <ul style="list-style-type: none"> <li>Enter Settlement Date and Enter Redemption Date</li> <li>Enter Annual Yield to Maturity</li> <li>Enter Annual Coupon Interest Rate</li> <li>Enter Purchase Price (in points) and Enter Commission</li> <li>Enter Maturity Value (in points)</li> </ul>	N	[ A ]	N
		MMDD,YYYY	[2nd] [ A' ]	MMDD.YYYY
		MMDD,YYYY	[2nd] [ B' ]	N
		%I	[ B ]	%I
		%C	[ C ]	%C
		Buy	[ D ]	Buy
		Com	[R/S]	Com
		MAT	[ E ]	MAT
4a	Enter Personal Income Tax if desired	Tax	[2nd] [ D' ]	Tax
4b	Enter Capital Gains Tax if desired	CGT	[R/S]	CGT

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5	Find the missing term <ul style="list-style-type: none"> <li>Number of periods to Maturity</li> <li>Annual Yield to Maturity</li> <li>Annual Coupon Interest Rate</li> <li>Purchase Price</li> <li>Maturity Value</li> </ul>		[2nd] [ E' ] [ A ]	N
			[2nd] [ E' ] [ B ]	%I
			[2nd] [ E' ] [ C ]	%C
			[2nd] [ E' ] [ D ]	Buy
			[2nd] [ E' ] [ E ]	MAT
6	Find Current Yield (requires the entry of Annual Coupon Interest, Purchase Price, and Maturity Value in Step 3).		[2nd] [ C' ]	CYLD

## NOTES:

- Input and output values are printed and labeled.
- All calculations are net of taxes and commissions.
- Initialization assumes a 365 day year, semiannual coupon payments and that bond prices are entered in 10ths.

To change to a 360 day year:

Enter: 360

Press: [STO] 25

To change bond entry method to 32nds:

Enter: 32

Press: [STO] 27

To change number of coupon payments per year:

Enter: Number of Payments per Year

Press: [STO] 26

These changes must be made following Step 2 if desired. Note that if the actual dates are entered, the program computes the actual number of days between dates and then uses the 365 or 360 figure in transforming to annual terms.



STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select Program		[2nd] [Pgm] 11	
2	Initialize		[SBR] [CLR]	0.
3	Enter Number of Periods ( $N \geq 4$ )	N	[2nd] [A']	N
4a	Enter Price Index for Period i	$PI_i$	[A]	$PI_i$
4b	Enter Dividend Index for Period i	$DI_i$	[B]	$DI_i$
4c	Ensure that entries made in 4a and 4b are correct and enter period (Repeat 4a-c for each period)		[C]	$PI_i$
5	Calculate Regression Data (Expected Return, Variance of Return, and Standard Deviation)		[2nd] [C']	$\bar{x}ERI^*$ $VARI^*$ SDI
6	Enter Stock Number	Stock	[2nd] [B']	Stock
7a	Enter Price for Period i	$P_i$	[A]	$P_i$
7b	Enter Dividend for Period i	$D_i$	[B]	$D_i$
7c	Ensure that entries made in 7a and 7b are correct and enter period (Repeat 7a-c for each period)		[C]	$P_i$

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8	Calculate Regression Data (Alpha, Beta, Expected Return, Variance of Return, Standard Deviation, and Coefficient of Determination)  (Repeat Steps 6, 7 and 8 for all stocks in the Portfolio)		[2nd] [C']	$A^*$ $B^*$ $ER^*$ $VAR^*$ $SD^*$ $R^2$
---	---	--	------------	--

## NOTES:

- All input and output values are printed and labeled.
  - Once [C] is pressed no changes may be made for that period. If an error is entered on key [C] while entering the market index, return to Step 2; while entering a stock, return to Step 6.
  - 26 + 2N registers are required for program use. Repartition if necessary.
  - Invalid results occur if  $N < 4$ .
- \* Results are displayed for approximately 3 seconds and should be written down immediately if a PC-100A printer is not available.

# PORTFOLIO SELECTION – SHARPE'S MODEL

SA-12

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select Program		[2nd] [Pgm] 12	
2	Initialize		[SBR] [CLR]	0.
3	Enter Expected Return of the Index	$\bar{x}$ ER1	[2nd] [A']	$\bar{x}$ ER1
4	Enter Variance of Return of the Index	VARI	[2nd] [B']	VARI
5	Enter Number of Stocks in Portfolio	N	[2nd] [C']	N
6	Enter Risk Factor ( $\phi \geq 0$ )	$\phi$	[2nd] [D']	$\phi$
7a	Enter Alpha for Stock i	$\alpha$	[A]	$\alpha$
7b	Enter Beta for Stock i	$\beta$	[B]	$\beta$
7c	Enter Variance of Return for Stock i	Var	[C]	Var
	OR			
	Enter Standard Error of Estimate for Stock i	SER	[D]	SER
7d	Ensure that entries made in 7a-c are correct and enter stock (Repeat Step 7 for each stock)		[E]	No Change

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8	Compute Weights of Individual Stocks		[2nd] [E']	WGTS*
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## NOTES:

1. Input and output values are printed and labeled.
  2. Once [E'] is pressed, no changes may be made for that stock. If an error is discovered, return to Step 2.
  3. 26 + 3N registers are required for program use. Repartition if necessary.
- \* The weights are displayed in order for about 3 seconds.

# PORTFOLIO BOOKKEEPING

SA-13

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select Program		[2nd] [Pg] 13	
2	Initialize		[SBR] [CLR]	0.
3	Enter Date Bought	MMDD.YYYY	[2nd] [A']	BD
4	Enter Present Date	MMDD.YYYY	[2nd] [B']	PD
5	Enter Date to be Sold	MMDD.YYYY	[2nd] [C']	SD
6	Enter Number of Securities or Contracts Bought or Sold	N	[A]	N
7	Enter Cost of Purchase of Security or Contract	Cost	[B]	Cost
8	Enter Current Market Price of Security or Contract Purchased	MP	[C]	MP
9	Enter Annual Dividends per Share (or Coupon Payments per Bond) of Purchased Security	INC	[D]	INC
10	Calculate: Total Cost Market Value Annual Income Gain/Loss Yield Annualized Growth Total Yield		[E]	TC* MV* AI* G/L* %Y* %AG* %TY
11	(Repeat Steps 3-10 for each Security or Contract in the Portfolio) Display Portfolio Totals (may be performed at any time): Total Cost Market Value Annual Income Gain/Loss Yield Annualized Growth Total Yield		[2nd] [D']	$\Sigma TC^*$ $\Sigma MV^*$ $\Sigma AI^*$ $\Sigma G/L^*$ $P\%Y^*$ $P\%AG^*$ $P\%TY^*$

NOTE: \* Displayed for approximately three seconds.

# CAPITAL ACCUMULATION PLANNING

SA-14

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select Program		[2nd] [Pgm] 14	
2	Initialize		[SBR] [CLR]	0.
3	Enter Present Year	Present	[ A ]	Present
4	Enter Future Year	Future	[2nd] [ A' ]	Future
5	Enter Present Net Worth	PNW	[ B ]	PNW
6	Enter After-Tax Income	INC	[ C ]	INC
7	Enter Percent of Income Invested	INV	[2nd] [ C' ]	INV
8	Enter Annual Return on Investments	%I	[ D ]	%I
9	Enter Growth in After-Tax Income	%G	[ E ]	%G
10	Compute Future Net Worth		[2nd] [ B' ]	FNW
11	Enter Inflation Rate and Calculate Present Value of Future Net Worth	IR	[2nd] [ D' ]	PV

- NOTES:
1. Input and output values are printed and labeled. (Steps 3 and 4 are not labeled allowing the user to enter "years" for businesses and "ages" for individuals. Entries must be compatible.)
  2. The PNW entered in Step 5 must be positive.

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# DAYS BETWEEN DATES

SA-15

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select Program		[2nd] [Pgm] 15	
2	Initialize		[SBR] [CLR]	
3	Enter First Date	MMDD.YYYY	[ A ]	MMDD.YYYY
4	Enter Second Date	MMDD.YYYY	[ B ]	MMDD.YYYY
5	Find Number of Days Between Dates		[ C ]	No. Days

- NOTES:
1. Calculations are valid only after 1582.
  2. Erroneous entries such as Feb. 30 yield incorrect results without any warnings.
  3. The date factor (see Appendix A) may be obtained by entering the date and pressing [2nd] [ A' ].

NOTES

NOTES

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