

Programmable ^{TI}58/59

Agriculture

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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 [x:t] θ [2nd] [P-R] \rightarrow y; [x:t] \rightarrow x

Rectangular to Polar

x [x:t] y [INV] [2nd] [P-R] \rightarrow θ ; [x:t] 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 x:t y_i 2nd $\Sigma+$

Data Entry Removal: x_i x:t y_i INV 2nd $\Sigma+$

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

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

Calculations	Key Sequence
Mean of y-array then x-array	2nd \bar{x} x:t
Standard Deviation (N - 1 Weighting) of y-array then x-array (N Weighting) of y-array then x-array	INV 2nd \bar{x} x:t INV 2nd 0: 11 \sqrt{x} x:t \sqrt{x}
Variance (N Weighting) of y-array then x-array (N - 1 Weighting) of y-array then x-array	2nd 0: 11 x:t 2nd \bar{x} x^2 x:t x^2
Y-Intercept	2nd 0: 12
Slope after y-intercept	x:t
Correlation Coefficient	2nd 0: 13
y' for new x	2nd 0: 14
x' for new y	2nd 0: 15

SPECIAL CONTROL OPERATIONS

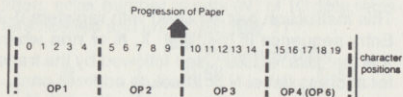
Each special control operation is called by pressing **2nd** **Op** **nn** where **nn** is the 2-digit code assigned to each operation (short form addressing can be used here). These operations use up to 4 pending operations and 1 sub-routine level.

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	*	√	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).

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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] [0p] 16**. To repartition, enter number of sets (N) of 10 data registers needed and press **[2nd] [0p] 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	239/29*	719/29
4	159/39	639/39
5	079/49	559/49
6	000/59	479/59*
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
↓	↓	40	Ind	73*	RCL Ind
09	9	42	STO	74*	SUM Ind
10	E	43	RCL	75	-
11	A	44	SUM	76	lbl
12	B	45	y ^x	77	x=t
13	C	47	CMs	78	Σ+
14	D	48	Exc	79	\bar{x}
15	E	49	Prd	80	Grad
16	A'	50	x	81	RST
17	B'	52	EE	83*	GTO Ind
18	C'	53	(84*	Op Ind
19	D'	54)	85	+
20	CLR	55	÷	86	St flg
22	INV	57	Eng	87	It flg
23	Inx	58	Fix	88	DMS
24	CE	59	Int	89	π
25	CLR	60	Deg	90	List
27	INV	61	GTO	91	R/S
28	log	62*	Pgm Ind	92*	INV SBR
29	CP	63*	Exc Ind	93	.
30	tan	64*	Prd Ind	94	+/-
32	x=t	65	X	95	=
33	x ²	66	Pause	96	Write
34	√x	67	x=t	97	Dsz
35	1/x	68	Nop	98	Adv
36	Pgm	69	Op	99	Prt
37	P→R	70	Rad		
38	sin	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	<p>Reads information into bank number listed on card if current partition matches that on card.</p> <p>If partition incorrect, card is passed, but not read — display flashes card side passed.</p>
1, 2, 3, 4	<p>Expects card with this side number to be read — displays that side number.</p> <p>© 2010 Datamath If another side is entered or if partition is incorrect, card is passed but not read — display flashes card side passed.</p>
-1, -2, -3, -4	<p>Forces side to be read into this bank number regardless of the partition or the number on the card.</p> <p>A protected program cannot be forced into any bank or alternate partition.</p>
Any other number	<p>Card is passed but not read — rightmost two integers in display flash.</p>

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
	DIAGNOSTIC MODULE CHECK			
1	Select program		[2nd] [Pgm] 01	
2	Run diagnostic		[SBR] [=]	12. * * *
	LINEAR REGRESSION INITIALIZATION			
1	Select program		[2nd] [Pgm] 01	
2	Initialize linear regression		[SBR] [CLR]	0.

*These values are printed automatically if a print cradle is connected.

**A flashing number indicates a malfunction; check *Personal Programming* for an explanation of procedure to follow.

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STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select program		[2nd] [Pgm] 02	
2a	Enter first data value	value	[A]	2.
2b	Enter next data value	value	[R/S]	next memory #
	Repeat this step for each data value to be stored			
	If the values are to be stored in data registers other than those beginning with 01			
3a	Enter memory register number for the first data value	number	[STO] 00	number
3b	Enter data value to be stored	value	[2nd] [A']	number + 1
3c	Enter next data value	value	[R/S]	next memory #
	TO OBTAIN A LIST OF VALUES			
	If a print cradle is used			
4a	Enter memory number for first value stored	memory #	[INV] [2nd] [List]	

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4b	End the listing		[R/S]	memory #
	If no printer is used and the first memory register is 01		[CLR] [B]	1.
				pause
4c			[R/S]	first value
	Repeat this step until all memory registers are checked			next memory #
	If a printer is not being used and the first memory register is not 01			pause
5a	Enter register number of first value	memory #	[STO] 00	memory #
			[2nd] [B']	pause
5b			[R/S]	first value
	Repeat this step until all memory registers are checked			next memory #
				pause
				next value
6	Correct an entry	correct value	[STO] memory #	correct value
7	Remove the fixed decimal		[INV] [2nd] [Fix]	

METRIC CONVERSIONS**FM-03**

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select program Conversion of Weight—Kilograms and Pounds		[2nd] [Pgm] 03	
2	Enter weight in kilograms	weight in kg	[A]	weight in lb
3	Enter weight in pounds Conversion of temperature—Centigrade and Fahrenheit	weight in lb	[2nd] [A']	weight in kg
4	Enter temperature in Centigrade	°C	[B]	°F
5	Enter temperature in Fahrenheit	°F	[2nd] [B']	°C

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BATCH MIX**FM-04**

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select program		[2nd] [Pgm] 04	
2	Enter percent or amount of first ingredient	1st ingredient	[STO] 01	1st ingredient
3	Enter second ingredient	2nd ingredient	[STO] 02	2nd ingredient
4	Continue entering ingredients	ingredient	[STO] memory #	ingredient
5	Enter total pounds or percent of ingredients in lb or % formula	lb or %	[A]	lb or %
6	Enter total batch desired		[B]	1.** amount of 1st ingredient*
7			[R/S]	2.** amount of 2nd ingredient*
8	Repeat this step for all ingredients		[R/S]	ingredient number** amount of ingredient*

*These values are printed automatically if the calculator is connected to a print cradle.

**Value is displayed for approximately one-half second.

BEEF COW RATION ANALYZER

FM-05

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select program If cows are in the last six months of pregnancy		[2nd] [Pg] 05	
2	Enter average weight of pregnant cows	wt	[A]	0.00
	Enter 0 if in middle three months of pregnancy	0	[R/S]	1.00
	or			
	Enter 1 if in the last three months of pregnancy	1	[R/S]	1.00
	If cows are nursing calves or in the first three months of pregnancy			
	Enter average weight of cows nursing calves	wt	[2nd] [A']	1.00
	Enter milking ability of cow average milker (10-18 lb daily)=1 superior milker (over 18 lb)=2	1 or 2	[R/S]	
3	Enter feedstuffs		[2nd] [B']	1.00

PRISON PRISON

PRISON PRISON

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4	Enter the following items for each feedstuff:			
	cost/unit	cost/unit	[R/S]	2.00
	pounds/unit	lb/unit	[R/S]	3.00
	pounds fed/day	lb/day	[R/S]	4.00
	percent dry matter	% dry matter	[R/S]	5.00
	percent crude protein	% CP	[R/S]	6.00
	percent TDN	% TDN	[R/S]	7.00
	percent calcium	% Ca	[R/S]	8.00
	percent phosphorus	% P	[R/S]	1.00
	Repeat this step for additional feedstuffs			
5	Enter the number of cow days the ration provides	number	[B]	DM I ^a (dry-matter intake)
6	Calculate the consumption ratio		[R/S]	ratio ^a
7	Calculate the TDN consumption		[C]	TDN consumption ^a
8	Calculate the TDN ratio		[R/S]	ratio ^{a,b}
9	Calculate crude protein consumed		[D]	CP ^a
10	Calculate crude protein ratio		[R/S]	CP ratio ^{a,b}
11	Enter percent crude protein in ration	% CP	[CLR] [2nd] [D']	lb of CP supplement ^a
12	Calculate how much crude protein is needed for the entire herd		[R/S]	CP supp for herd ^a

13	Calculate calcium consumption	[E]	Ca ^{a,b}
14	Calculate how much the ration is long or short in Ca	[R/S]	Ca in ration ^{a,b}
15	Calculate phosphorus consumption	[R/S]	P ^{a,b}
16	Calculate how much the ration is long or short in P	[R/S]	P in ration ^{a,b}
17	Calculate the ration cost per cow	[2nd] [E']	cost/cow ^a
18	Alter ration by adding or subtracting and begin with step 4 to incorporate ration adjustment		

^a These values are automatically printed if a print cradle is connected.

^b A flashing display indicates that the ration is deficient.

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FEEDLOT RATION ANALYZER

FM-06

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select program		[2nd] [Pgm] 06	
2	Enter animal weight	wt*	[A]	1.00
3	Enter price per unit of feedstuff	price*	[R/S]	2.00
4	Enter pounds per price unit of the feedstuff	lb*	[R/S]	3.00
5	Enter on as-fed basis pounds per day on a per head or on a per lot basis	lb*	[R/S]	4.00
6	Enter the dry-matter fraction of feedstuff	fraction*	[R/S]	5.00
7	Enter the net energy value for maintenance (NEm)	mcals/lb*	[R/S]	6.00
8	Enter the net energy value for gain (NEg)	mcals/lb*	[R/S]	7.00
9	Enter the metabolizable protein value	protein value*	[R/S]	8.00
10	Enter the urea-fermentation potential (UFP) value	UFP value*	[R/S]	9.00
11	Enter percent calcium for the feedstuff	% Ca*	[R/S]	10.00

12	Enter percent phosphorus Repeat steps 3 through 12 for additional feedstuffs	% P*	[R/S]	1.00
13	Enter the number of animals that consumed the feedstuff	N*	[B]	consumption ratio
14	Calculate the pounds of dry matter per head		[R/S]	lb consumed per head*
15	Calculate average daily gain in lb		[C]	Steers—ADG (average daily gain)*
			[2nd] [C']	Heifers—ADG*
16	Calculate feed cost per lb of gain		[R/S]	cost/lb
17	Enter non-feed cost per head	cost	[R/S]	total cost/lb
18	Enter lb of prot supp (supplemental protein) fed per day	lb	[D]	4.00
	If no supplement was fed, enter 0	0	[D]	4.00
19	Enter dry-matter fraction of protein supplement	fraction	[R/S]	7.00
20	Enter metabolizable protein value of protein supplement	protein value	[R/S]	8.00
21	Enter urea-fermentation potential value	UFP value	[R/S]	lb of supplement needed per head
22	If supplement entered on a lot basis, calculate supplementation on a lot basis		[R/S]	lb of supplement per lot

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23	Repeat step 18 through 21 for different protein supplements Determine type of supplement needed positive = non-protein nitrogen supplements negative = natural protein supplement		[E]	positive or negative
24	Calculates surplus or deficiency of calcium in lb per head		[2nd] [D']	Ca deficiency or surplus**
25	Calculate surplus or deficiency of phosphorus		[R/S]	P deficiency or surplus**
26	Calculate the calcium to phosphorus ratio		[R/S]	Calcium to phosphorus ratio
27	Enter % calcium in Min Supp (mineral supplement)	% Ca	[2nd] [E']	10.00
28	Enter % phosphorus in Min Supp If feedstuffs entered on a lot basis, calculate amount of supplement needed per lot	% P	[R/S] [R/S]	lb of Min Supp amt of supp per lot

*These values are automatically printed if a print cradle is connected.

**A flashing negative number indicates a deficiency.

MP AND UFP DETERMINATION

FM-07

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select program		[2nd] [Pgm] 07	
	PART A			
2	Enter percent crude protein	%	[A]	%
3	Enter percent TDN	%	[B]	%
4	Enter percent crude protein degraded	%	[C]	%
5	Calculate grams of metabolizable protein per lb or Calculate grams of metabolizable protein per kg		[D] [2nd] [D']	metabolizable protein/lb metabolizable protein/kg
6	Calculate grams of urea		[R/S]	urea
	PART B			
2	Enter percent crude protein	%	[A]	%
3	Enter percent crude protein from NPN	%	[E]	%
4	Calculate grams of urea		[R/S]	urea

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DAIRY RATION BALANCER

FM-08

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select program		[2nd] [Pgm] 08	
	RATION BALANCER			
2a	Enter body weight	weight (lb)	[A]	weight*
2b	Enter daily milk weight	weight (lb)	[R/S]	weight*
2c	Enter milk fat test	%	[R/S]	%*
2d	Enter age of cow in years	age	[R/S]	age*
3	Enter forage data		[B]	1.
3a	Enter price per unit	price*	[R/S]	2.
3b	Enter weight per unit	weight* (lb)	[R/S]	3.
3c	Enter as-fed forage per animal	as-fed forage*	[R/S]	4.
3d	Enter forage DM fraction	DM fraction*	[R/S]	5.
3e	Enter NE _L value (DM basis)	NE _L * (mcals/lb)	[R/S]	6.
3f	Enter percent CP (DM basis)	%*	[R/S]	7.
3g	Enter percent Ca (DM basis)	%*	[R/S]	8.
3h	Enter percent P (DM basis)	%*	[R/S]	1.
3i	Repeat 3a through 3h for any additional forages offered			

4a	Calculate amount and composition of grain mixture (89% DM basis)		[C]	milk production level* DM intake* ** amount of grain mixture* ***
4b	Calculate fraction of total DM intake		[R/S]	fraction of total DM intake
4c	Calculate percent CP		[R/S]	% CP*
4d	Calculate percent Ca		[R/S]	% Ca
4e	Calculate percent P		[R/S]	% P
5	Calculate expected DM intake		[2nd] [C']	Expected daily DM intake
5a	Calculate intake as percent of body weight		[R/S]	%
5b	Enter a number above 1 to increase DM intake or a number below 1 to decrease it Repeat step 4 Optional: Add new forages to original forages Repeat set 3a–3i	number	[R/S]	number
			[2nd] [B']	1.

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	Optional: Change reference cow data if desired Repeat step 2a–2d	weight (lb)	[A]	weight*
6a	Enter lb of daily milk production	level*	[D]	DM intake* ** amount of grain mixture*
6b	Calculate amount of 44% CP supplement		[2nd] [D']	amount of supplement
6c	Calculate additional production levels in increments of 10 lb Calculate amount of 44% CP supplement Step 7 must follow either step 4 or step 6		[R/S]	level* ** DM intake* ** amount of grain mixture*
			[2nd] [D']	amount of supplement
7a	Calculate total daily DM intake		[E]	DM intake
7b	Calculate intake of as-fed forage		[R/S]	intake
7c	Calculate percent of as-fed forage in total ration		[R/S]	%
7d	Calculate total forage cost		[2nd] [E']	cost

PROTEIN TOP-DRESSING SCHEDULE

1a	Enter CP percentage of grain mixture available	%	[STO] 20	%
1b	Calculate grain mixture and 44% CP supplement as in step 6 of Ration Balancer			
RATION ANALYZER				
1	Enter reference cow data as in step 2 of Ration Balancer			
2	Enter forages and grain mixture as in step 3 of Ration Balancer			
3a	Evaluate ration — energy content		[C]	expected DM intake* ** amount of additional grain*
	If grain mixture is greater than 0, go to 3b			
	Enter 1	1	[STO] 00	1
	Generate number greater than 0		[R/S]	number > 0
	Store number		[STO] 02	
	Calculate percent CP in 1 lb of supplement		[R/S]	% CP*
	Calculate percent Ca		[R/S]	% Ca

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	Calculate percent P		[R/S]	% P
	Calculate amount of 44% CP supplement		[C]	Milk production* ** expected DM intake* ** 0.0
			[2nd] [D']	amount of 44% CP supplement
3b	Follow the same procedures as in step 4, part b, of Ration Balancer			

*These values are automatically printed when print cradle is attached.

**Value is displayed for approximately one-half second.

***Continuously flashing amount indicates that the amount is above 65% of the expected DM intake.

SWINE AND POULTRY RATION FORMULATION

FM-09

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Enter percent protein for feedstuff 1	%	[STO] 01	%
2	Enter and store percent nutrient for remaining nutrients in feedstuff 1, respectively	%	[STO] memory register number	%
3	Enter and store nutrients of feedstuff 2, respectively	%	[STO] memory register number	%
4	Continue for feedstuffs 3, 4, and 5	%	[STO] memory register number	%
5	Optional: Store values on magnetic card ¹	4	[2nd] [Write]	4
	To read values, turn calculator on, enter 4, and insert magnetic card	4		
6	Select program		[2nd] [Pgm] 09	0
7	Initialize		[2nd] [E']	639.390
			[C]	3.000
8	Enter percent of feedstuff 3 in formula	%	[R/S]	4.000
9	Enter percent of feedstuff 4	%	[R/S]	5.000
10	Enter percent of feedstuff 5	%	[R/S]	0.000

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11	Enter percent of protein or percent of lysine	%	[A]	% of feedstuff 1 required*
12	Calculate percent of feedstuff 2		[R/S]	% of feedstuff 2*
13	Calculate percent of protein in finished feed		[R/S]	% of protein*
14	Calculate percent of lysine		[R/S]	% of lysine*
15	Calculate percent of third, fourth, and fifth nutrient, respectively		[R/S]	% of third nutrient*
			[R/S]	% of fourth nutrient*
			[R/S]	% of fifth nutrient*
16	Enter quantity of batch	quantity*	[E]	amount of feedstuff 1*
			[R/S]	amount of feedstuff 2*
			[R/S]	amount of feedstuff 3*
			[R/S]	amount of feedstuff 4*
			[R/S]	amount of feedstuff 5*
17	To formulate new ration, repeat from step 8			
	Optional Procedure for High Moisture Content			
18	Enter percent of dry matter in feedstuff 1	%*	[D]	% of feedstuff 1 calculated on wet basis*

Calculate percent of remaining feedstuffs	[R/S]	% of feedstuff 2*
	[R/S]	% of feedstuff 3*
	[R/S]	% of feedstuff 4*
	[R/S]	% of feedstuff 5*

¹ For TI Programmable 59 only.

*These values are automatically printed when a print cradle is connected.

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STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select program		[2nd] [Pgm] 10	0.
2	Initialize		[2nd] [E']	0.00
3	Enter the pounds of first ingredient	lb *	[A]	1.00
4	Enter the percent or amount per unit of weight of the first nutrient in feedstuff 1	% or amount	[R/S]	2.00
5	Enter percent or amount of second nutrient	% or amount	[R/S]	3.00
6	Enter percent or amount of third nutrient	% or amount	[R/S]	4.00
7	Enter percent or amount of fourth nutrient	% or amount	[R/S]	5.00
8	Enter percent or amount of fifth nutrient	% or amount	[R/S]	6.00
9	Enter percent or amount of sixth nutrient	% or amount	[R/S]	7.00
10	Enter percent or amount of seventh nutrient	% or amount	[R/S]	0.

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11	Repeat steps 3 through 10 for as many feedstuffs as are called for in the formula			
12	Calculate the total weight of ingredients entered		[B]	ration comp.*
13	Calculate average analysis for the first nutrient		[R/S]	analysis
14	Calculate average analysis for the second nutrient		[R/S]	analysis
15	Calculate average analysis for the third to seventh nutrients by repeating step 14		[R/S]	analysis

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select program		[2nd] [Pgm] 11	
2	Initialize		[2nd] [E']	1.00
	Enter price of corn	price*	[R/S]	2.00
3	Enter price of 44% protein soybean meal	price*	[R/S]	3.00
4	Enter price of dicalcium phosphate	price*	[R/S]	0.00
5	Calculate l-lysine value		[C]	l-lysine*
6	Calculate fat value		[D]	fat*
7	Calculate value of various feeds		[A]	1.
	Enter metabolizable energy (kcal/lb)	kcal/lb	[R/S]	2.
8	Enter percent lysine	%	[R/S]	3.
9	Enter percent phosphorus	%	[R/S]	\$/cwt*
10	Calculate values of a second feed-stuff by repeating steps 7, 8, and 9			
	Optional procedure for TI-59			
1	Initialize		[2nd] [E']	1.

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2	Assign identification numbers beginning with 10			
3	Assign register numbers: energy stored in 3 X identification number lysine stored in energy register + 1 phosphorus stored in energy register + 2			
4	Store values in registers using manual manipulation or FM-02	ME ly P	[STO] 30 [STO] 31 [STO] 32	ME ly P
5	Record values on magnetic card		[CLR] [INV] [2nd] [Fix]	0.
	Enter 2 and insert magnetic card	2	[2nd] [Write]	2.
	Enter 3 and insert second side of magnetic card	3	[2nd] [Write]	3.
	Retrieve values by entering identification number	ID	[B]	value*

*These values are automatically printed if a print cradle is connected.

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select program		[2nd] [Pgm] 12	
2	Enter days gestation	days	[STO] 00	days
3	Enter number of days from breeding for first management practice	days	[STO] 01	days
	If practice occurs before breeding			
	Enter number of days from breeding	days	[+/-] [STO] 01	days
4	Enter number of days from breeding for management practices	days	[STO] 02	days
		days	[STO] 03	days
		days	[STO] 04	days
5	Enter number of days from birth for first management practice	days	[STO] 05	days
	If practice occurs before birth			
	Enter number of days from birth	days	[+/-] [STO] 05	days
6	Enter number of days from birth for management practices	days	[STO] 06	days
		days	[STO] 07	days
		days	[STO] 08	days

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7	Enter breeding date	month.day*	[A]	DOB* (date of birth)
8	Calculate dates for management practices from breeding		[B]	date 1*
			[C]	date 2*
			[D]	date 3*
			[E]	date 4*
9	Enter DOB	DOB*	[2nd] [A']	BRED* (breeding date)
10	Calculate dates for management practices from birth		[2nd] [B']	date 5*
			[2nd] [C']	date 6*
			[2nd] [D']	date 7*
			[2nd] [E']	date 8*

*These values are automatically printed when a print cradle is connected.

BEEF WEANING AND YEARLING WEIGHT ADJUSTMENT

FM-13

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
	BEEF WEANING			
1	Select program		[2nd] [Pgm] 13	
	Clear memories		[2nd] [CMs]	
2	Initialize		[2nd] [E']	1.00
3	Enter standard birth weights for male and female calves	male standard birth weight	[R/S]	2.00
		female standard birth weight	[R/S]	3.00
	or			
	Enter zeros for birth weight if you will be providing the birth weights	0	[R/S]	2.00
		0	[R/S]	3.00
4	Enter the weaning date	date	[R/S]	day of the year
5	Enter one of the lists of age-of-dam factors from Table 1 in appropriate memories (mm)	data	[STO] mm	data
	Repeat this step until all data is entered			
6	Enter the calf sex code (bull = 1, steer = 2, heifer = 3)	calf sex	[A]	calf sex
7	Enter calf's birth date	DOB (date of birth)	[B]	age in days

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8	Enter age of dam in years	cow age	[C]	cow age
9	Enter the calf's birth weight if you will be providing it	birth weight	[D]	birth weight
10	Enter calf's actual weaning weight	weight	[E]	adjusted 205-day wt
11	Determine sex-adjusted 205-day weight		[R/S]	sex-adjusted 205-day weight
12	Repeat any or all of steps 6 through 11 for the next calf			
	YEARLING WEIGHTS			
1	Select program		[2nd] [Pgm] 13	
2	Initialize		[2nd] [E']	1.00
			[R/S]	2.00
			[R/S]	3.00
3	Enter the date which calves started on test	date	[R/S]	day of the year
4	Enter the date on which the yearling weight was taken	date	[R/S]	number of days animal was on test
5	Enter the cattle's birth date	DOB	[2nd] [A']	age in days
6	Enter the weight at the start of the gain test	starting weight	[2nd] [B']	starting weight

7	Enter the cattle's adjusted 205-day weight	205 a. wt	[2nd] [C']	205 a. wt
8	Enter the cattle's actual yearling weight	yearling weight	[2nd] [D']	WDA (weight per day of age)
9	Calculate ADG (average daily gain)		[R/S]	ADG
10	Calculate cattle's adjusted 365-day weight		[R/S]	adjusted 365-day weight
11	Repeat any or all of steps 5 through 8 and follow step 8 with 9 and 10 for the next cattle			

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PRODUCTION WORK SHEET

FM-14

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Clear memories		[2nd] [CMs]	0.
2	Select program		[2nd] [Pgm] 02	0.
	Enter the following data:			
	annual interest rate (divide by 2 for feeder-pig production; adjust for time required to complete production cycle for farrow-to-finish production)	rate	[A]	2.
	labor cost	cost	[R/S]	3.
	vet, medical, and operating costs	costs	[R/S]	4.
	marketing cost	cost	[R/S]	5.
	breeding stock investment (per litter for feeder-pig and farrow-to-finish production)	investment	[R/S]	6.
	depreciation per animal	depreciation	[R/S]	7.
	depreciation, interest, tax, insurance on equipment and buildings	depreciation	[R/S]	8.
	death rate as percent of animal	death rate	[R/S]	9.
	replacement rate of breeding stock	rate	[R/S]	10.
	weight of culls	weight	[R/S]	11.

size of animal crop	crop	[R/S]	12.
average net market weight	weight	[R/S]	13.
estimated price of culls	cull price	[R/S]	14.
estimated market price of animal	market price	[R/S]	15.
feed requirements and costs			
feed 1 quantity	quantity	[R/S]	16.
price	price	[R/S]	17.
feed 2 quantity	quantity	[R/S]	18.
price	price	[R/S]	19.
feed 3 quantity	quantity	[R/S]	20.
price	price	[R/S]	21.
feed 4 quantity	quantity	[R/S]	22.
price	price	[R/S]	23.
feed 5 quantity	quantity	[R/S]	24.
price	price	[R/S]	25.

TO OBTAIN A LIST OF VALUES

If a print cradle is used

3	Enter 0	0	[INV] [2nd] [List]	0.
	End listing		[R/S]	

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If a print cradle is not being used

4		[B]	1.00
			pause
		[R/S]	first value
			memory register
			pause
			next value
	Repeat until all memory registers are checked		
	Correct an entry by following procedures in step 5		
	Select program	[2nd] [Pgm] 14	
	Calculate necessary selling price of animal to cover total cost of feed and other variable costs (adjusted for value of wool and cull ewe; adjusted for value of cull cow)	[A]	\$ VC (variable costs)
	Calculate necessary selling price of animal to cover total cost of animals per animal unit (per litter in farrow-to-finish production)	[B]	\$ TC (total cost)
	Calculate profit and return per animal (per litter in feeder-pig and farrow-to-finish production)	[C]	Prof & Rt (profit and return)

Calculate returns to labor and capital per animal unit (per litter in feeder-pig and farrow-to-finish production)		[D]	Ret/L & C (returns to labor and capital)
Enter alternative crop and calculate necessary selling price to cover total costs with an alternative animal crop (number of hogs marketed in farrow-to-finish production)	crop	[E]	alt. crop
Enter weight and calculate necessary selling price of animals to cover total costs with an alternative marketing weight (calf-weaning weight for cow-calf production; pig-weaning weight for feeder-pig production)	wt	[2nd] [E']	alt. wt
Calculate total feed cost		[2nd] [A']	feed cost
Calculate other variable costs		[R/S]	variable costs
Calculate total fixed costs		[R/S]	fixed costs
Calculate cull adjustment		[R/S]	cull adjustment
Calculate total adjusted variable cost		[2nd] [B']	adj. VC
Calculate adjusted total cost		[2nd] [C']	adj. TC
Calculate sales per unit (per litter in feeder-pig and farrow-to-finish production)		[2nd] [D']	weight sold

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Calculate cull sold per unit (per litter in feeder-pig and farrow-to-finish production)		[R/S]	culls sold per unit
Calculate total sales per unit (per litter in feeder-pig and farrow-to-finish production)		[R/S]	total sales
Calculate production per unit (per litter in feeder-pig and farrow-to-finish production)		[R/S]	production per unit
Calculate gross income per unit including culls (per litter in feeder-pig and farrow-to-finish production)		[R/S]	gross income

CATTLE, PIG, OR LAMB FEEDING WORK SHEET

FM-15

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Clear memories		[2nd] [CMs]	0.
2	Select data entry and retrieval program		[2nd] [Pgm] 02	0.
	Enter pay weight of feeder	pay weight	[A]	2.
	Enter feeder price	feeder price	[R/S]	3.
	Enter annual interest rate	rate	[R/S]	4.
	Enter feeding period	feeding period	[R/S]	5.
	Enter labor cost	labor cost	[R/S]	6.
	Enter percent death loss of feeder cost	%	[R/S]	7.
	Enter marketing cost including hauling and commission	marketing cost	[R/S]	8.
	Enter operating and miscellaneous costs	operating cost	[R/S]	9.
	Enter fixed cost divided by turnaround rate	fixed cost	[R/S]	10.
	Enter net market weight	market weight	[R/S]	11.
	Enter estimated selling price	selling price	[R/S]	12.

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	Enter desired return to management and profit	return	[R/S]	13.
	Enter feed requirements & costs:			
	Feed 1, Quantity	quantity	[R/S]	14.
	Price	price	[R/S]	15.
	Feed 2, Quantity	quantity	[R/S]	16.
	Price	price	[R/S]	17.
	Feed 3, Quantity	quantity	[R/S]	18.
	Price	price	[R/S]	19.
	Feed 4, Quantity	quantity	[R/S]	20.
	Price	price	[R/S]	21.
	TO OBTAIN A LIST OF VALUES			
	If a print cradle is used			
3a	Enter 0	0	[INV] [2nd] [List]	0.
	If no printer is used			
3b			[B]	1.
				pause
				value stored in 01 memory
			[R/S]	next memory number
				pause
				stored value

	Repeat this step until all memory registers are checked			
3c	Correct errors by using the procedure for changing input in Step 5			
4	Select program	[2nd] [Pgm] 15		
	Calculate selling price to cover cost of feeder, feed and other variable costs	[A]		\$/cwt VC
	Calculate selling price to cover cost of finishing animal	[B]		\$/cwt TC
	Calculate profit and return to management per head	[C]		Prof & RT
	Calculate price that can be paid for feeder per cwt	[D]		\$/cwt FDR
	Calculate price per head for feeder	[R/S]		\$/hd FDR
	Calculate price that can be paid for feed 1	[E]		\$/FD. 1
	Calculate feeder cost	[2nd] [A']		FDR cost
	Calculate total feed cost	[2nd] [B']		Feed cost
	Calculate cost per cwt of net gain	[R/S]		\$/cwt
	Calculate other variable costs	[2nd] [C']		other VC
	Calculate nonfeed cost per day	[R/S]		\$/day
	Calculate fixed costs	[R/S]		\$/hd

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	Calculate total cost to finished animal		[2nd] [D']	tot. cost
	Calculate total cost per cwt of net gain		[R/S]	\$/cwt
	Calculate gross income		[2nd] [E']	gr. inc.
	TO CHANGE DATA VALUES			
5	Enter desired data value	value	[STO] memory register number	value
	Remove the fixed decimal		[INV] [2nd] [Fix]	
	TO STORE AND RETRIEVE VALUES IF USING THE TI-59			
6a	Store data on magnetic cards		[INV] [2nd] [Fix]	
			[CLR] 4	
			[2nd] [Write]	
6b	Insert card in bottom slot			
	Retrieve data on magnetic cards		[INV] [2nd] [Fix]	
			[CLR] 4	
	Insert card in bottom slot			

LAND PURCHASE: FINANCIAL AND ECONOMIC ANALYSIS FM-16A

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Repartition memory (TI-58 only)	5	[2nd] [Op] 17	79.49
2	Select program		[2nd] [Pgm] 02	
	Store the following values: ^a			
	Interest rate	decimal rate	[A]	2.
	Number of repayment periods	number	[R/S]	3.
	Total number of acres in tract	acres	[R/S]	4.
	Sale price	price	[R/S]	5.
	Down payment rate	decimal rate	[R/S]	6.
	Proportion of principal to be repaid after final payment	decimal	[R/S]	7.
	If the net cash flow is to be calculated			
	Enter 0	0	[R/S]	8.
	Otherwise			
	Net cash flow	\$/acre	[R/S]	8.

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If the net cash flow has been entered in the previous step, enter 0 for the remaining data values in this step				
Debt repayment for added machinery and equipment investment	\$/acre	[R/S]		9.
Property taxes plus other land ownership costs	\$/acre	[R/S]		10.
Expected crop yield	bu/a or ton/a	[R/S]		11.
Expected price for crop	\$/bu or \$/ton	[R/S]		12.
Cost of seed, fertilizer, chemicals, crop insurance, and other crop costs	\$/acre	[R/S]		13.
Machinery fuel, lube, repair costs plus custom-hire costs	\$/acre	[R/S]		14.
Other cash costs of crop production	\$/acre	[R/S]		15.
Number of acres in each crop (if necessary, repeat the inputs corresponding to memories 10-15 for the second, third, and fourth crops raised, storing values in memory registers 20-25, 30-35, and 40-45, respectively)	acres	[R/S]		16.
Outside cash flow per acre (+ or -)	\$/acres	[R/S]		17.

TO OBTAIN A LIST OF VALUES				
3a	If a print cradle is used	0	[INV] [2nd] [List]	0.
	Retrieve values in memories			
3b	If a printer is not being used		[B]	1.
	Retrieve values in memories		[R/S]	pause first value memory number pause next value
	Repeat this step until all memories have been checked			
4	Correct an entry	correct value	[STO] memory #	correct value
5	Select program		[2nd] [Pgm] 16	
6	If a net cash flow is stored in memory 07, the outputs may be found in any order; otherwise			
6a	Calculate the net cash flow	flow	[2nd] [B']	cash flow
	Store net cash flow in 07		[STO] 07	cash flow
6b	Calculate loan amount to be borrowed		[A]	loan amount
	Calculate total loan payment each period		[B]	payment

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7	If payment plan requires level principal payments with interest on unpaid principal	N (number)	[2nd] [St flag] 0	
	Set flag			
	If payment plan requires level payments		[INV] [2nd] [St flag] 0	
	Reset flag		[C]	P (principal)
	Enter the payment number to be analyzed			
	Do not clear display		[R/S]	I (interest paid)
	Do not clear display		[R/S]	RP (principal remaining)
	Calculate maximum loan repayable		[D]	max. loan
	Calculate maximum price which can be paid for the land		[E]	max. \$
	Calculate number of periods needed to repay the loan		[2nd] [A']	periods
	Remove the fixed decimal		[INV] [2nd] [Fix]	

^a Zeros should be stored in memories not used

FARM LOAN ANALYSIS

FM-16B

STEP	PROCEDURE	ENTER	PRESS	DISPLAY
1	Select program		[2nd] [Pgm] 16	
2	If using the TI-58, repartition memory		5 [2nd] [Op] 17	79.49
	INSTALLMENT LOANS WITH EQUAL TOTAL OR EQUAL PRINCIPAL PAYMENTS			
3a	Clear all memories		[2nd] [CMs]	
3b	Store interest rate per period ^a	interest rate	[STO] 01	interest rate
3c	Store number of payment periods	payment periods	[STO] 02	payment periods
3d	Store total principal due	principal	[STO] 04	principal
	If loan stipulates equal principal payments			
3e	Set flag		[2nd] [St flg] 0	
	If loan stipulates equal payments			
	Reset flag		[INV] [2nd] [St flg] 0	
3f	Enter the period number to be analyzed	N	[C]	P (principal due)

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	Do not clear display		[R/S]	I (interest due)
	Do not clear display		[R/S]	RP (principal remaining)
3g	Analyze other periods by repeating steps d, e, and f			
	Analyze loans with different terms by repeating steps a through f			
	SINGLE REPAYMENT LOAN			
4a	Clear memories		[2nd] [CMs]	
4b	Store annual interest rate	rate	[STO] 01	rate
	Store principal due	P	[STO] 04	P
	If user knows the number of days in loan			
4c	Store number of days	days	[STO] 05	days
	Otherwise			
	Store beginning date	month, day number	[STO] 02	month, day number
	Store ending date	month, day number	[STO] 03	month, day number
4d	Calculate total interest due		[2nd] [E']	total interest

4e	Calculate other single repayment loans by repeating steps a through e		
5	Remove the fixed decimal	[INV] [2nd] [Fix]	

^a Zeros should be stored in memories not used

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NOTES

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