

# TI-82/TI-83 Calculator Appendix

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Programs listed below are referenced in *Part A* of this *Guide*. They should be transferred to you via a cable using the LINK mode of a TI-82 or a TI-83, transferred to your calculator using the TI-GRAPH LINK™ cable and software for a PC or Macintosh computer and a disk containing these programs, or, as a last resort, typed in your calculator. Refer to your owner's *Guidebook* for instructions on typing in the programs or transferring them via a cable from another calculator.

(Instructors who have the TI-GRAPH LINK™ software can contact the author of this *Guide* at [ibbrh@clermson.edu](mailto:ibbrh@clermson.edu) and request that the programs be sent to them via e-mail or on a computer disk. Be sure to specify whether you use a Macintosh or a PC-compatible computer for either method of obtaining the programs. All programs can then easily be transferred to students.)

The programs and the chapter of *Calculus Concepts* in which each program is first referenced are listed below. The programs given below run on both the TI-82 and TI-83 graphing calculators, but not all the programs are needed for the TI-83. All these programs can be transferred directly from a TI-82 to a TI-83 and vice-versa.

PROGRAM NAME	PROGRAM SIZE (bytes)	CHAPTER FIRST REFERENCED	CALCULATOR
AUTOSCL	223	1	TI-82
DI FF	445	1	TI-82, TI-83
LOGI STI C	1622	2	TI-82
NUMI NTGL	991	6	TI-82, TI-83
SI NREG	1091	8	TI-82
EULER	237	11	TI-82, TI-83

## OPTIONAL

LSLI NE	473	1	TI-82, TI-83
SECTAN	449	4	TI-82, TI-83

The code for each of the programs follows. If you have to type in these programs rather than having them transferred from another calculator or a computer, it is strongly suggested that you compare the line-by-line instructions given in the code with what you type in your calculator. Even one misplaced symbol or letter will cause the program to not properly execute.

## AUTOSCL • Program

```

: Cl rHome
: Di sp "HAVE F(X) IN Y1"
: Di sp ""
: Input "Xmin? ", A
: AÍ Xmin
: Input "Xmax? ", B
: BÍ Xmax
: iPart ((B - A) / 20) Í W
: If W=0: Goto 1
: Lbl 2
: seq(X, X, A, B, W) Í L
: YÍ (L) Í L0
: mi n(L0) Í P
: max(L0) Í Q
: Q - P Í T
: P - . 15TÍ Ymin
: Q + . 15TÍ Ymax
: iPart (abs (Ymax - Ymin) / 10) Í R
: WÍ Xscl: RÍ Yscl
: Cl rLi st L, L0
: Di spGraph
: Stop
: Lbl 1
: If B - A 9: Then
: . 1Í W: Else
: 1Í W: End
: Goto 2

```

## EULER • Program

```

: Cl rHome
: Cl rLi st L, L1
: FnOff
: Di sp "HAVE DY/DX IN Y1"
: Di sp ""
: Input "NUMBER OF STEPS= ", N
: Input "STEP SIZE= ", H
: Input "INITIAL INPUT= ", X
: Input "INITIAL OUTPUT= ", Y
: For(I, 1, N, 1)
: XÍ L1(I)
: YÍ L1(I)
: YÍ Í T
: X+HÍ X
: Y+H* TÍ Y
: Di sp "INPUT, OUTPUT IS"
: Di sp X
: Di sp Y
: Pause
: End
: XÍ L1(N+1): YÍ L1(N+1)
: Pl ot 1(xyLi ne, L1, L1, E)
: ZoomSt at

```

## DIFF • Program

```

: Cl rHome
: di m L1 Í N: N- 1Í di m L0
: For(H, 1, N- 1, 1)
: L1(H+1) - L1(H) Í L0(H)
: End
: For(H, 1, N- 2, 1)
: If L0(H+1) L0(H)
: Goto 2
: End
: di m L1 Í M: M- 1Í di m L0
: For(A, 1, M- 1, 1)
: L1(A+1) - L1(A) Í L0(A)
: End
: M- 2Í di m L0
: For(B, 1, M- 2, 1)
: L0(B+1) - L0(B) Í L0(B)
: End
: Di sp "HAVE X IN L1"
: Di sp "HAVE Y IN L1 - SEE"
: Di sp "1ST DIFF IN L0,
: Di sp "2ND DIFF IN L0, "
: M- 1Í di m L
: 1Í E
: For(E, 1, M, 1)
: If L1(E) = 0
: Goto 1: End
: For(E, 1, M- 1, 1)
: (L0(E) / L1(E)) * 100Í L(E)
: End
: Di sp "PERCENT CHANGE"
: Di sp "IN L": Stop
: Lbl 1
: Cl rLi st L
: Di sp "PERCENT CHANGE"
: Di sp "NOT CALCULATED"
: Stop
: Lbl 2
: Di sp "INPUT VALUES NOT"
: Di sp "EVENLY SPACED"
: Stop

```

```

LOGISTIC          • Program
: Cl rHome
: Di sp "DATA IN LĪ, LĪ"
: Di sp ""
: Di sp "ENTER CONTINUES"
: Pause
: Cl rHome
: If di m LĪ di m LĪ: Then
: Di sp "LIST LENGTHS"
: Di sp " NOT EQUAL"
: Stop
: End
: di m LĪ Í M
: MÍ di m LĀ
: max(LĪ) * 1. 01 Í Z
: ZÍ C
: sum LĪ Í T
: ln LĪ Í LĪ
: sum LĪ Í V
: OÍ N
: Repeat (C Z) or (N=3)
: ln (-1*LĪ+C) Í LĀ
: sum LĪ Í U
: (-sum (LĀ*LĪ)+sum (LĪ*LĪ)+
  (U-V)/M*T)/(sum (LĪ%) - T%/M) Í B
: e^((U-V+B*T)/M) Í A
: e^(-B*LĪ) Í LĪ
: (1+A*LĪ) „Í LĀ
: sum (LĪ*LĀ)/sum (LĀ%) Í C
: End
: C*LĀ Í LĪ
: sum ((LĪ-LĪ)%) Í E
: OÍ N
: . 5È-10 Í Y
: 2*YÍ R
: Cl rHome
: Output (2, 1, "STEP: ")
: Output (6, 1, "SSE: ")
: While (R>Y) and (N<20)
: N+1 Í N
: Output (2, 7, N)
: Output (6, 6, E)
: { 3, 1 } Í di m [A]
: CÍ [A] (1, 1): AÍ [A] (2, 1)
: BÍ [A] (3, 1)
: Output (3, 2, "WORKING. . . ")
: e^(-B*LĪ) Í LĪ
: (1+A*LĪ) „Í LĀ
: C*LĀ Í LĪ
: LĪ*LĀ% Í LĪ
: { 3, 1 } Í di m [C]: -2*sum ((LĪ-
  LĪ)*LĀ) Í [C] (1, 1)
: 2*C*sum ((LĪ-LĪ)*LĪ) Í [C] (2, 1)
: -2*C*A*sum ((LĪ-LĪ)*LĪ*LĪ) Í
  [C] (3, 1)
: { 3, 3 } Í di m [E]
: 2*sum LĀ% Í [E] (1, 1)
: 2*sum ((LĪ-2*LĪ)*LĪ) Í [E] (1, 2)
: [E] (1, 2) Í [E] (2, 1)

```

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(Program LOGISTIC continued)
: 2*A*sum ((2*LĪ-LĪ)*LĪ*LĪ) Í
  [E] (1, 3)
: [E] (1, 3) Í [E] (3, 1)
: 2*C*sum ((C*LĪ-2*(LĪ-LĪ)*LĪ*
  LĪ)*LĪ) Í [E] (2, 2)
: 2*C*sum ((-C*A*LĪ+(2*A*LĀ*LĪ-
  1)*(LĪ-LĪ))*LĪ*LĪ) Í [E] (2, 3)
: [E] (2, 3) Í [E] (3, 2)
: 2*C*A*sum ((C*A*LĪ-(2*A*LĀ*LĪ-
  1)*(LĪ-LĪ))*LĪ*LĪ%) Í [E] (3, 3)
: Output (3, 2, "COMPUTING ")
: -1*[E] „*[C] Í [D]
: 2*EÍ F
: 10 Í S
: -1 Í I
: While (F>E) and (S>0)
: I+1 Í I
: If I>5: Then
: OÍ S
: El se
: Output (4, 2, "COMPUTING ")
: Output (4, 12, I)
: . 1*SÍ S
: S*[D]+[A] Í [B]
: [B] (1, 1) Í C
: [B] (2, 1) Í A
: [B] (3, 1) Í B
: e^(-B*LĪ) Í LĪ
: C*(1+A*LĪ) „Í LĪ
: sum (LĪ-LĪ)% Í F
: End
: End
: Output (4, 2, "
: If S=0: Then
: Output (3, 2, "STILL WORKING")
: -1*[C] Í [D]
: ([C]È*[C]) * ([C]È*[E]*[C]) „Í [B]
: 10*[B] (1, 1) Í S
: -1 Í I
: While (F>E) and (S>0)
: I+1 Í I
: If I>5: Then
: OÍ S
: El se
: Output (4, 2, "COMPUTING ")
: Output (4, 12, I)
: . 1*SÍ S
: S*[D]+[A] Í [B]
: [B] (1, 1) Í C
: [B] (2, 1) Í A
: [B] (3, 1) Í B
: e^(-B*LĪ) Í LĪ
: C*(1+A*LĪ) „Í LĪ
: sum (LĪ-LĪ)% Í F
: End
: End
: Output (4, 2, "

```

(Program LOGISTIC continued)

```

: If S=0: Then
: Output (3, 2, "NO IMPROVEMENT")
: Else
: Output (3, 2, " ")
: End
: End
: F1E
: {0, 0} → L0
: S*[D](2, 1) * [A](2, 1) → L0(1)
: S*[D](3, 1) * [A](3, 1) → L0(2)
: abs L0(1) - L0(2)
: max(L0) → R
: End
: {R, Y}
: "L/(1+Ae^(-BX))" → Y0
: C1L
: ClrHome
: ClrList L0, L0, L0, L0
: Disp "MODEL"
: Disp "Y=L/(1+Ae^(-BX))"
: Output (4, 2, "L=")
: Output (4, 4, L)
: Output (6, 2, "A=")
: Output (6, 4, A)
: Output (7, 2, "B=")
: Output (7, 4, B)

```

```

LSLINE
: O1A: O1B: 11C
: "AX+B" → Y1
: Ymax - Ymi → H
: .2H + Ymax → Ymax
: FnOff
: Text(0, 0, "X TICK=", Xscl, " Y
  TICK=", Yscl)
: Pause
: ClrHome
: Lbl 1
: Text(0, 0, "GUESS SLOPE, Y-
  INTERCEPT")
: Pause
: FnOn
: Input "SLOPE=", A
: Input "Y-INTERCEPT=", B
: 2-Var Stats
: Lbl 2
: O1S
: For(K, 1, n)
: L1(K) → X
: (L1(K) - Y1) % → S1S
: Line(L1(K), L1(K), X, Y1)
: End
: Pause
: Disp ""
: Disp "SSE=", S
: Pause
: If C=2
: Goto 3
: Input "TRY AGAIN? 1Y 2N", C
: If C=1
: Goto 1
: LinReg(ax+b)
: "aX+b" → Y1
: Disp ""
: Disp "PRESS ENTER TO"
: Disp "SEE YOUR LINE"
: Disp "AND BESTFIT LINE"
: Pause
: DispGraph
: Pause
: ClrHome
: Disp "NOW, PRESS ENTER"
: Disp "TO SEE ERRORS"
: Disp "FOR BESTFIT LINE"
: Pause
: a1A: b1B
: Goto 2
: Lbl 3
: Disp "SLOPE=", a
: Disp "Y-INTERCEPT=", b
: FnOff

```

• Program

```

NUMINTGL          • Program
: OÍ A: OÍ L: OÍ B
: Cl rHome
: Pl otsOff
: Di sp "ENTER F(X) IN Y1"
: Di sp ""
: Di sp "CONTINUE?"
: Input "YES(1) NO(2) ", G
: If G=2: Stop
: Di sp ""
: Di sp "DRAW PICTURES?"
: Input "YES(1) NO(2) ", H
: Cl rHome
: Input "LEFT ENDPOINT? ", A
: Input "RIGHT ENDPOINT? ", B
: If H=1: Then
: AÍ Xmi n: BÍ Xmax
: i Part ((B- A) /20) Í W
: If W=0: Goto Z
: Lbl U
: seq(X, X, A, B, W) Í L
: YÍ (L) Í L
: mi n(L) Í Ymi n
: If Ymi n>0: OÍ Ymi n
: max(L) Í Ymax
: If Ymax<0: OÍ Ymax
: WÍ Xscl
: i Part (abs (Ymax- Ymi n) /10) Í Yscl
: Cl rLi st L, L
: End
: Lbl 0
: Cl rHome
: Di sp "ENTER CHOICE: "
: Di sp "LEFT RECT (1)"
: Di sp "RIGHT RECT (2)"
: Di sp "TRAPEZOIDS (3)"
: Input "MIDPT RECT (4) ", R
: Lbl 1
: Cl rDraw
: Input "N? ", N
: (B- A) /NÍ W
: OÍ S: 1Í C
: Lbl 2
: If R=1: Goto 3
: If R=2: Goto 4
: If R=3: Goto 3
: If R=4: Goto 5
: Lbl 3
: A+(C- 1) WÍ X
: XÍ J: X+WÍ L
: Goto 7
: Lbl 4
: A+CWÍ X
: X- WÍ J: XÍ L
: Goto 7
: Lbl 5
: If H 1: Then
: If N>5: Then
: 1Í Z: W/2Í H: AÍ X

```

```

(Program NUMINTGL continued)
: Lbl 8
: X+HÍ X: YÍ +SÍ S
: A+ZWÍ X
: IS>(Z, N): Goto 8
: SWÍ S: Goto T
: End: End
: A+CW- W/2Í X
: X- W/2Í J
: X+W/2Í L
: Goto 7
: AÍ G: G+WÍ G: GÍ V
: Lbl 9
: VÍ X: YÍ Í Y: V+WÍ X: 4Y+2YÍ +SÍ S
: V+2WÍ V
: If V<B: Goto 9
: G- WÍ X: YÍ Í E
: BÍ X: YÍ Í F
: (W/3) (S+E- F) Í S
: Goto T
: Lbl 7
: YÍ Í K: K+SÍ S
: If H=1: Goto D
: Lbl I
: IS>(C, N)
: Goto 2
: If R=3: Then
: AÍ X: YÍ Í P
: BÍ X: YÍ Í Q
: S+(Q- P) /2Í S
: End
: W* SÍ S
: Lbl T
: Di sp "SUM=", S
: Pause
: Cl rHome
: Lbl E
: Menu("ENTER CHOICE", "CHANGE N",
1, "CHANGE METHOD", 0, "QUIT", F)
: Lbl F
: Stop
: Lbl D
: If R=3: Then
: YÍ (L) Í M
: El se: KÍ M
: End
: Li ne(J, 0, J, K)
: Li ne(J, K, L, M)
: Li ne(L, M, L, 0)
: If C=N: Pause
: Goto I
: Lbl Z
: If B- A 9: Then
: . 1Í W: El se
: 1Í W: End
: Goto U

```

```

SECTAN      • Program
: Cl rHome
: Pl otsOff
: Cl rDraw: 2ÍR
: Di sp ""
: Di sp "HAVE F(X) IN YÍ AND"
: Di sp "DRAW GRAPH OF F"
: Di sp ""
: Di sp "CONTINUE? "
: Input "YES(1) NO(2)", C
: If C=2: Stop
: Di sp ""
: Di sp "X- VALUE OF POINT"
: Input "OF TANGENCY? ", A
: Lbl 1
: Di sp ""
: Di sp "PRESS ENTER TO "
: Di sp "SEE SECANT LINES"
: If R=1: Goto 2
: Di sp "FROM THE LEFT"
: Goto 3
: Lbl 2
: Cl rDraw
: Di sp "FROM THE RIGHT"
: Lbl 3
: Di sp "APPROACH TANGENT"
: Di sp "LINE"
: Pause
: (Xmax- Xmin) / 3ÍK
: If K>50: 48ÍK
: For (J, 1, 5, 1)
: A- KÍX
: If R=1: A+KÍX
: (YÍ(X) - YÍ(A)) / (X- A) ÍM
: DrawF (M(X- A) + YÍ(A))
: K/2ÍK
: End
: Pause
: If R=1: Goto 4
: 1ÍR: Goto 1
: Lbl 4
: Cl rHome
: Di sp "PRESS ENTER TO"
: Di sp "SEE TANGENT LINE"
: Pause
: Cl rDraw
: Tangent (YÍ, A)

```

```

SINREG      • Program
: Cl rHome
: Di sp "DATA IN LÍ, LÌ"
: Di sp ""
: Di sp "ENTER CONTI NUES"
: Pause
: Cl rHome
: di m LÍ ÍN
: If N di m LÌ: Then
: Di sp "LÍ, LÌ ARE NOT"
: Di sp "SAME LENGTH"
: Stop
: End
: OÍP
: Repeat P>0
: Input "PERIOD GUESS? ", P
: End
: Di sp "MAXI MUM"
: Input "I TERA TION? ", M
: max(mi n(M, 16), 1) ÍM
: OÍ A
: 2 / PÍ B
: OÍ C
: medi an(LÌ) ÍD
: (10^-10) * sum (LÌ - D) %ÍP
: 13Í di m LÓ
: For (I, 1, M)
: Fi ll (0, LÓ)
: For (K, 1, N)
: { B*LÍ (K) } Í LÔ
: { cos LÔ(1), si n LÔ(1) } Í LÔ
: { LÔ(1), LÔ(2), LÍ (K) * (C*LÔ(1) -
  A*LÔ(2)), A*LÔ(1) + C*LÔ(2) + D-
  LÍ (K) } Í LÔ
: { LÔ(1) % LÔ(1) * LÔ(2), LÔ(1), LÔ(1)
  * LÔ(3), LÔ(1) * LÔ(4), LÔ(2) % LÔ(
  2), LÔ(2) * LÔ(3), LÔ(2) * LÔ(4), LÔ
  (3), LÔ(4), LÔ(3) % LÔ(3) * LÔ(4) }
+ LÓÍ LÓ
: End
: [ [ LÓ(1), LÓ(2), LÓ(3), LÓ(4), LÓ(5)
  ] [ LÓ(2), LÓ(6), LÓ(7), LÓ(8), LÓ
  (9) ] [ LÓ(3), LÓ(7), N, LÓ(10), LÓ(
  11) ] [ LÓ(4), LÓ(8), LÓ(10), LÓ(12)
  , LÓ(13) ] ] Í [ A ]
: For (K, 1, 4)
: For (J, K+1, 4)
: If abs [ A ] (J, K) > abs [ A ] (K, K)
: Then
: rowSwap( [ A ], K, J)
: End: End
: If [ A ] (K, K) 0: Then
: * row(1/[ A ] (K, K), [ A ], K) Í [ A ]
: For (J, 1, 4)
: If J K
: * row+(-[ A ] (J, K), [ A ], K, J) Í [ A ]
: End: End: End
: Di sp I
: If I>1 and [ A ] (4, 4) =0: Then
: MÍ I

```

(Program SINREG continued)

```

: El se
: A- [ A] ( 1, 5) Í A
: B- [ A] ( 4, 5) Í B
: C- [ A] ( 2, 5) Í C
: D- [ A] ( 3, 5) Í D
: LÓ(5) * [ A] ( 1, 5) +LÓ(9) * [ A] ( 2, 5)
: LÓ(11) * [ A] ( 3, 5) +LÓ(13) * [ A] ( 4, 5)
  Í K
: I f K<P: MÍ I
: End: End
: AÍ P
: ( P%+C%) Í A
: I f P<0: Then
: -. 5* - tan,, ( C/P) Í C
: El se
: . 5* - tan,, ( C/P) Í C
: End
: Di sp " "
: Di sp "ENTER CONTI NUES"
: Pause
: " Asi n ( BX+C) +D" Í Yİ
: OÍ di m LÓ
: OÍ di m LÔ
: Cl rHome
: Di sp "MODEL"
: Di sp "Y=Asi n ( BX+C) +D"
: Out put ( 4, 2, "A=")
: Out put ( 4, 4, A)
: Out put ( 5, 2, "B=")
: Out put ( 5, 4, B)
: Out put ( 6, 2, "C=")
: Out put ( 6, 4, C)
: Out put ( 7, 2, "D=")
: Out put ( 7, 4, D)

```

