TI–81 PROGRAM: SIMPSON'S RULE & TRAPEZOIDAL RULE (press ENTER at end of line)

KEY IN	DISPLAY	EXPLANATION
PRGM ➢ ENTER SIMPSON	Prgm 1: SIMPSON	Program named "SIMPSON"
2nd VARS ➢ ➢	FnOff	Deselects all functions
Disp 2nd α "LOWERLIMIT"	Disp "LOWERLIMIT"	Lower limit of integration
Input αA	Input A	After ?, type in the lower limit of integration
Disp 2nd α "UPPERLIMIT"	Disp "UPPERLIMIT"	Upper limit of integration
Input αB	Input B	After ?, type in the upper limit of integration
Disp 2nd α"NϕSUBINTERVALS"	Disp "N SUBINTERVALS"	Number of subintervals for [A, B] is N
Disp 2nd α "ENTER EVEN N"	Disp "ENTER EVEN N"	The even integer N is to be entered
Input αN	Input N	After ?, type in N
ϕ STO S	ϕ → S	0 is stored in location S (for Simpson's Rule)
ϕ STO V	ϕ → V	0 is stored in location V (for the Trapezoidal Rule)
(αB – αA) ÷ (αN) STO αW	(B – A)/N → W	Subinterval width (B–A)/N stored in location W
1 STO J	1 → J	1 is stored in location J
Lbl 1	Lbl 1	Start of loop
αA + 2(αJ – 1)αW STO L	A + 2(J – 1)W → L	Left endpoint of [A+2(j–1)W, A+2jW] stored in L
αA + 2αJαW STO R	A + 2JW → R	Right endpoint of [A+2(j–1)W, A+2jW] stored in R
(αL + αR) ÷ 2 STO M	(L + R)/2 → M	Midpoint of [A+2(j–1)W, A+2jW] stored in M
αL STO X | T	L → X	L is stored in location X
2nd VARS 1 STO L	Y_1 → L	Y_1(L) is stored in location L
αM STO X | T	M → X	M is stored in location X
2nd VARS 1 STO M	Y_1 → M	Y_1(M) is stored in location M
αR STO X | T	R → X	R is stored in location X
2nd VARS 1 STO R	Y_1 → R	Y_1(R) is stored in location R
αW(αL+4αM+αR) ÷3 + αS STO S	W(L+4M+R)/3 + S → S	New sum is stored in location S (for Simp. Rule)
αW(αL+2αM+αR) ÷2 + αV STO V	W(L+2M+R)/2 +V → V	New sum is stored in location V (for Trap. Rule)
IS > 2nd αJ , αN÷2)	IS > (J,N/2)	Increment J one step. If J>N/2, skip next command
Goto 1	Goto 1	Program returns to Lbl 1 and loops again
Disp 2nd α "Simpson Rule"	Disp. "Simpson Rule"	Prepares for the Simpson's Rule approximation
Disp αS	Disp S	Displays the Simpson's Rule approximation S
Disp 2nd α "Trap. Rule"	Disp. "Trap. Rule"	Prepares for the Trapezoidal Rule approximation
Disp αV	Disp V	Displays the Trapezoidal Rule approximation V

To execute the program in order to evaluate $\int_z^b f(x)dx$, do the following: 2nd CLEAR (to quit the program)

Y= key in your function f(x) ENTER 2nd QUIT PRGM (choose the program) ENTER ENTER

The display reads LOWERLIMIT, ?	Key in	A	ENTER	(gives the lower limit of integration)
The display reads UPPERLIMIT, ?	Key in	B	ENTER	(gives the upper limit of integration)
The display reads ... ENTER N, ?	Key in	N	ENTER	(gives number of subinterval of [A, B]

The display then exhibits the Simpson Rule and Trapezoidal Rule approximations for the value of the integral. Note that with this program, the number of subintervals for each rule is even.

To execute the program again, just key in ENTER

Identification of italicized words in the program: Input (PRGM ➢ 2) Display (PRGM ➢ 1)
Label (PRGM 1) Goto (PRGM 2) IS > ((PRGM 4)

ϕ represents zero (distinguished from the letter 0)