PROGRAMMING YOUR CALCULATOR

Ref: TI-83 Guidebook – Chapter 16

§ 3.2 (and later parts of Chapter 3)

In preparation for our next class meeting, you will need to add the **RSUM** program to your calculator. You will need this program to compute the left and right Riemann sums that are required in some of the homework problems starting in § 3.2.

The **RSUM** program listing (for both TI-82 and TI-83) is on the back of this handout. The program can also be copied from the calculator that is on reserve in the Mathematics Library (LeConte College, 3rd floor). If you are using another calculator, you are on your own.

INTRO to PROGRAMMING

The basic instructions for programming are the same for all programs. The actual lines of the programs will differ. The basic steps are:

1. Reset: [2nd][MEM] [5: Reset] [2: Default] [2: Reset]

2. Create a program:

Select [PRGM]. *An alphabetical list of all programs on your calculator will be displayed.*

Highlight [NEW] by pressing [◄] and [►].

Select [1: Create New].

3. Name your program:

After `Name=`, type in the name (up to 8 letters) of your new program, then press [ENTER].

The flashing `A` after `Name=` indicates that the calculator is already in [ALPHA] mode.

(*This means that you will see the green character that appears above the key that is pressed.*)

4. Enter your program:

Each line in the program begins with the character : .

You will enter one command per line and use [ENTER] to move to the next line.

If you need to delete a character, use [DEL].

If you need to insert a character, use [2nd][INS].

If you need to move to a different line in a program, use [▲] and [▼].

When you have finished typing in all the program lines (in the proper order), press [2nd][QUIT].

5. Execute a program:

Press [PRGM] to enter program mode.

Select the program to be executed (by number or by using [▲] and [▼])

Your display will show `prgm` followed by the name of the program that was selected.

On this handout, any word in a program line that begins with an uppercase letter is actually a command and must be retrieved from a menu or key. For example:

`X` is $\boxed{\text{X,T,}\theta,n}$

`Y1` is $\boxed{\text{VARS}}$ then $\boxed{\text{Y-VARS}}$ then $\boxed{\text{1: Function}}$ then $\boxed{\text{1: Y}_1}$

$\rightarrow$ is $\boxed{\text{STO}\Rightarrow}$

`Disp` is $\boxed{\text{PRGM}}$ then $\boxed{\text{I/O}}$ then $\boxed{\text{3:Disp}}$

`IS>(` is $\boxed{\text{PRGM}}$ then $\boxed{\text{CTL}}$ then $\boxed{\text{A:IS>}}$

$\boxed{\textbf{RSUM}}$

Create a program named **RSUM** that will compute the right- and left-hand sums for the function $\boxed{Y_1}$ on a specified interval with n subdivisions.

1. Under $\boxed{\text{INTRO to PROGRAMMING}}$, follow steps **1** – **3** .

2. Under $\boxed{\text{INTRO to PROGRAMMING}}$, follow step **4**, enter the program:

```
: Disp "LOWER LIMIT"
: Input A
: Disp "UPPER LIMIT"
: Input B
: Disp "DIVISIONS"
: Input N
: A → X
: 0 → S
: (B-A)/N → H
: 1 → I
: Lbl P
: S+H*Y1 → S
: X+H → X
: IS>(I,N)
: Goto P
: Disp "LEFT SUM"
: Disp S
: B → X
: S+H*Y1 → S
: A → X
: S-H*Y1 → S
: Disp "RIGHT SUM"
: Disp S
```

3. To use **RSUM**:

enter the function-to-be-evaluated under $\boxed{\text{Y=}}$ as Y_1

press $\boxed{\text{2nd}}\boxed{\text{QUIT}}$ to return to main screen

select $\boxed{\text{PRGM}}$ $\boxed{\text{\#: RSUM}}$ (*# is the number corresponding to* `RSUM` *in the list of programs*)

`prgmRSUM` should appear on your main screen, begin execution by pressing $\boxed{\text{ENTER}}$

`LOWER LIMIT` will appear on one line; type the lower limit (a) of the interval of integration after the `?`, then press $\boxed{\text{ENTER}}$

`UPPER LIMIT` will appear on the next line; type the upper limit (b) of the interval of integration after the `?`, then press $\boxed{\text{ENTER}}$

`DIVISIONS` will appear on the next line; type the number of subintervals (n) that should be used in determining the sums after the `?`, then press $\boxed{\text{ENTER}}$

Voilà!

For example, you should find that the left- and right-hand sums for $\int_1^3 x^3\,dx$ with 100 subintervals are 19.7408 and 20.2608, respectively.