TI-82, TI-83+, TI-84 Graphing Calculator Fundamentals PART I

You should be able to:

- **Adjust screen contrast**
- **Do simple numerical calculations**
- **Get to the "HOME" screen**
- **Use the recursive feature to create the arithmetic sequence 2, 6, . . .**
- **Use the recursive feature to create the geometric sequence 2, 6, . . .**

- **Enter a function**
- **Turn an entered function on and off**

Enter the following functions: $Y_1 = 6.5x - 10.7$

$$Y_2 = 0.5x^2 + 0.2x - 1.6$$

- **Make a table of values for entered functions**

Build a table starting with x =–2 and incrementing by 0.5

- **Evaluate entered functions**

Use your calculator to find y when x = 2.3 for each function

- **Use last "entry" key to create a set of values for y**

Make a list of values of y_1 when x = {1,2,3,4,5}

- **Use "SOLVE" to find the value of x when y is given**

If y = –4, Solve y_1 for x

If y = 0, Solve y_2 for both values of x

If y = +4, Solve y_2 for both values of x

- **Make a graph of entered functions**
- **Set the WINDOW**
- **Use the Zoom feature**

Graph both functions y_1 and y_2

- **Trace the Graph of an entered function**
  Find the point of intersection by tracing

- **Use the "calc" feature on the graph**

Find the point of intersection using "intersect"

Turn off y_1

Graph y_2

Find the Minimum point of the curve y

Find an exact value of a point on a curve, such as when x =3

- **Split the screen so that you can see the function and the graph at the same time**

Turn off y_2 and turn on y_1

Split the screen so you see both the function and the graph of y_1

Review of Linear Functions

Definition: A linear function is a polynomial function that can be written in the form
$f(x) = mx + b$ where m and b are real numbers.

The graph of a linear function is a line.

Other forms of linear functions:

Point-slope form: $y - y_1 = m(x - x_1)$

Standard form: $Ax + By = C$ or $Ax + By + C = 0$

Linear Models:

$y = mx + b$ *or* $y = ax + b$

where m (or a) is slope (rate of change) and b is the y-intercept.

Slope, or rate of change, describes amount of change in y for each unit of change in x.
The y-intercept is the value of y when x = 0.

Ex: $y = 0.85x + 4.95$ where x = # kwh and y = monthly electric bill
$y = 0.04x - 6.50$ where x = hours worked and y amount saved
$y = 35x - 0$ where x = time in hours and y = distance traveled
$y = -0.14x + 0.02$ where x = amount of DDT in ecosystem, y = thickness of eggshell

Since two points determine a line, you should be able to give an equation of a line going through any two given points, by "hand" and using calculator features.
Ex: (2,5) and (–2,3)

Or, given a linear equation, you should be able to state points on the line. You can set up a table on the calculator to do this:
Ex: $y = 2x + 3$
TBLSET -> start at 0, increment by 1
TABLE

Given a table of coordinates, you should recognize a linear function. What are the characteristics of linear functions?

Ex:

x	y
1	3
2	5
3	7
4	9

x	y
0	0
1	4
2	8
3	12

x	y
2	3
4	6
6	9
8	12

These examples are "perfect" data (all the points fall on the line).

- **Enter functions in spreadsheet using STAT Tables**

Use lists to enter ordered pairs for $y = 2x + 3$

What if the data is "messy," i/e., the points don't all line up perfectly?

TI-82, TI-83+, TI-84 Graphing Calculator Fundamentals part II
You should be able to:

- **Enter data in STAT tables**

What if the points don't all "line up"???? In lab, you will collect data which do not line up, and you will be asked to find a line of best fit for the data.
Stat -> Edit -> feed in ordered pairs in L_1 and L_2

Enter: $x = \{1,2,3,4,5,6,7,8,9,10,11,12\}$ into L_1
$y = \{2,8,6,9,17,15,12,18,22,25,29,33\}$ into L_2

- **Graph data using STATPLOT**

Make a scatter plot of the data entered in L_1 and L_2

To look at graph of points, turn on Stat Plot 1; turn off y_1 and y_2

Graph -> ZoomStat

- **Find the line of best fit for the data**

Find line of best fit for the data in L_1 and L_2 using "LinReg"

Stat -> CALC ->LinReg (ax +b) -> ENTER

- **Put a line of best fit onto the statplot graph**

Put the equation of the line of best fit in y_3

What is LinReg???

Linear Regression is a statistical method of "fitting" a line to a messy set of points. To "fit" the line (called the "line of best fit"), regression uses a criteria called "least squares" criteria. (You may be quizzed on your understanding of "least squares" criteria.)

How can you tell how well a line "fits" the data?

One way to tell is to use the R^2 statistic. The statistic, R^2, is a measure of how well the line fits: the closer R^2 is to 1, the better the "fit"; closer to 0, the worse the "fit."

To "turn on" the R^2 statistic, CATALOG -> DiagnosticsOn

To see the R^2 statistic: STAT -> CALC -> LinReg

(The TI-82 will not give R^2. Instead, it gives R and you must square it)

Practice Problem:

Enter x = {1, 2, 3, 4, 5, 6} and y = {3, 5, 8.5, 10, 12, 15}

Find the line of best fit and graph it on the scatter plot

Evaluate y_3 when x = 9.5