

# ClassPad 101

for ClassPad Version 3.00+

## LESSON 4

### Introduction to Graph & Table

#### Welcome

In this lesson, we will review some of the graphing you did in Lesson 1, and learn more about graphing. You may or may not be familiar with the curves we are graphing. This is ok; work through the examples and get used to window "focus" and which button does what.




#### Lesson Goals

- To understand window focus
- To be able to open and use the Graph & Table application to graph equations for any course
- To understand that there are different types of curves

#### In Lesson 4, you will learn how to:

- Graph curves and inequalities
- Adjust view window settings
- Create tables of data
- Use analysis commands

#### Upon completion of this lesson, you will be able to answer the following questions:

1. What does it mean for a window to have "focus"?
2. What happens when you click the  button?
3. How do we change window settings?
4. Why would we need to change window settings?
5. How do we change a line style?
6. What does the  button do?
7. What does the  button open?

#### Time required

About 60 minutes.

## Getting Started


Focus is the key! Without it, having two windows open in the ClassPad would not make sense. You will understand this by the end of part 1. Focus is extremely important.

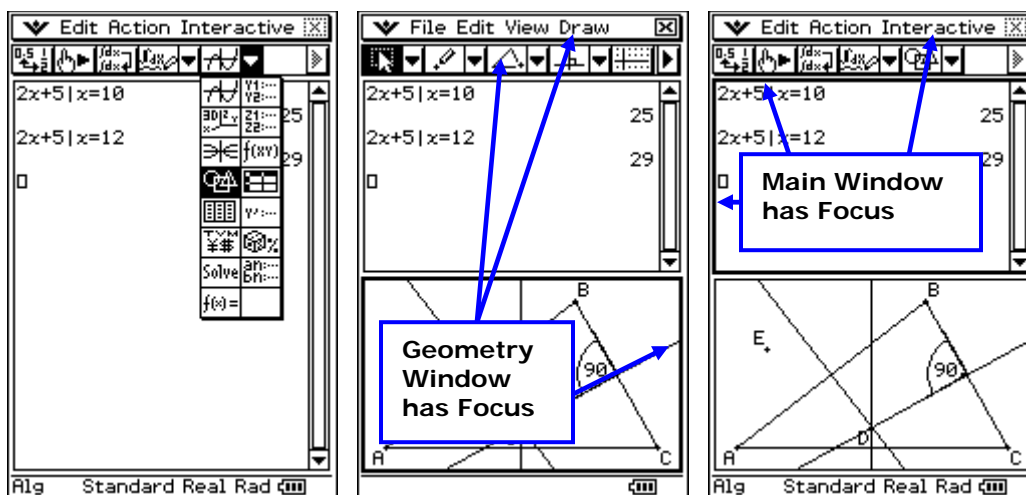
## PART I

In this part, you will learn about window focus and graphing in general.

### 1. Window Focus

What does it mean for a window to have “focus”? Think about what is changing in the ClassPad Manager as you try the following activity.

- Click J on the hard icon panel (next to m)
- Insert a **Geometry window** (it is ok if you have something different in your windows)
- Click in the upper window (Main window). Did anything change?
- Click in the lower window (Geometry window). Did anything change?
- Click back and forth between the windows a few times.
- Click the  button on the icon panel TWO times or more if you want to.
- Click the S button on the icon panel TWO times.



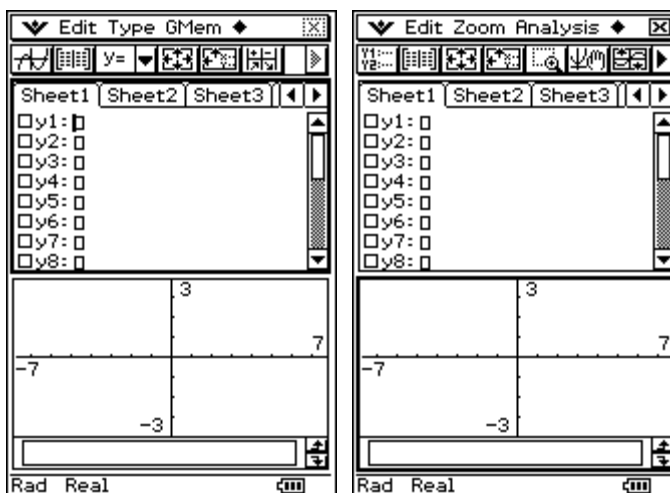
### [Very Important]

**Which window are you in? You are in the one with focus!**

- We say that the active window, the window with a bolder edge (border), is the window with “focus”.
- To change focus to another window, just click inside it.
- Remember that the toolbar and menu are specific to the window with focus AND its outer edge is bold.
- If you can't find a particular button, make sure the correct window has focus!

## 2. Graph & Table

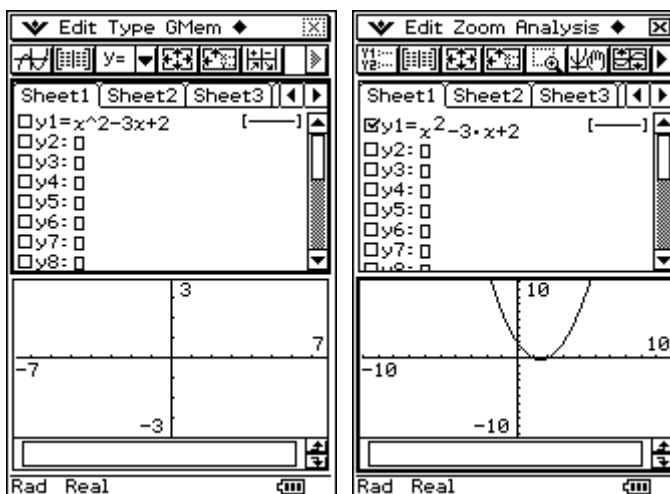
- Click **m** and then **W**
- Clear your window (select **Edit/Clear All**)
- Click in the **Graph Editor window** (upper window)
- Notice the toolbar buttons
- Click in the **Graph window** (lower window) to change the focus
- Notice the new toolbar buttons



## 3. The Graph Editor Window and Graph Window

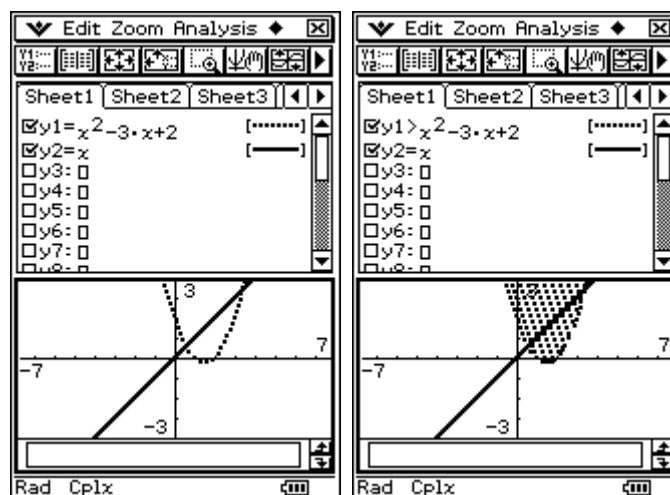
The Graph Editor allows us to input, graph and analyze equations.

- Click in the box *following y1* (you should see the cursor)
- Type in  $x^2 - 3x + 2$
- Press EXE** (notice the box in front of **y1** is now checked)
- Click the **\$** button
- Open the **Zoom** menu and select **Quick Standard**
- Select **Zoom/Quick Initialize** to return



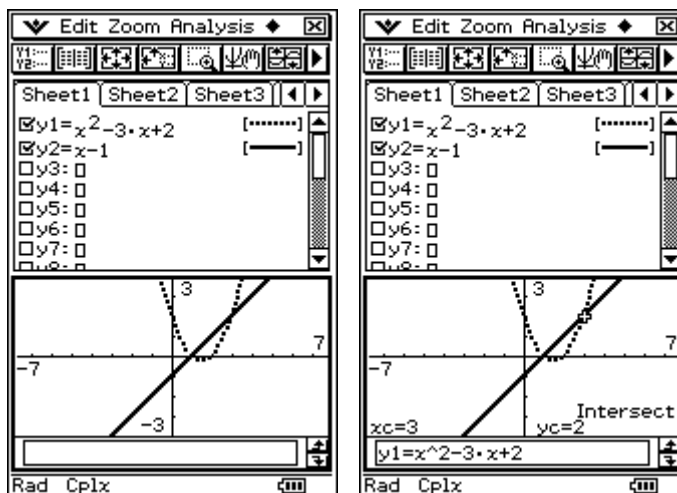
## 4. Line Style and Inequalities

- Following **y2** type in  $x$  and **press EXE** to check
- Click the **[—]** to the right of each equation
- A dialog should open
- Change each line style
- Graph by clicking **\$**
- Click on the **=** sign following **y1**
- Change the **=** sign to an inequality
- Graph by clicking **\$**
- Press **Style** to resize



## 5. Finding Points of Intersection

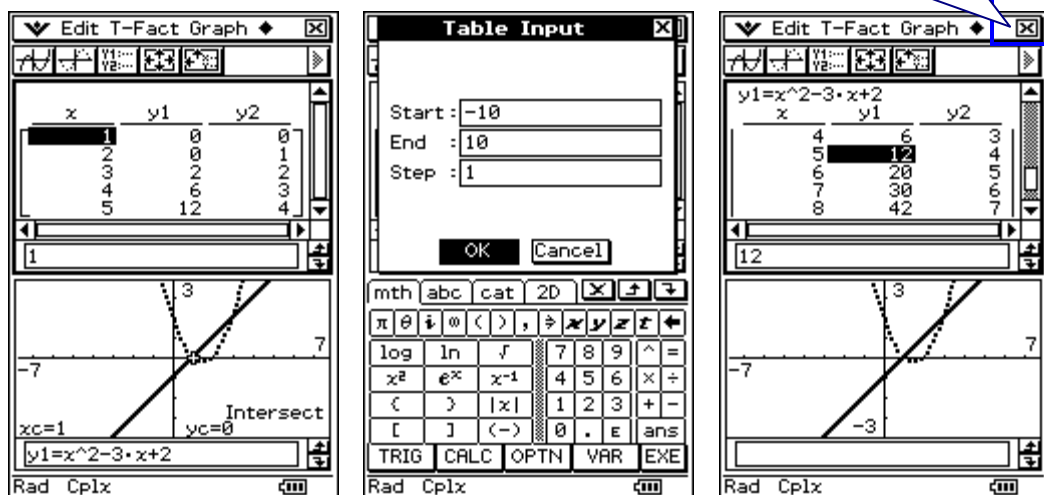
- Change **y1**'s sign back to an =
- Click following **y2=x**
- Change **x** to **x -1** and press EXE
- Re-graph by clicking \$
- Notice the Graph window now has focus
- Open the **Analysis** menu and select **G-Solve/Intersect**
- Click the **right arrow** on your keyboard or cursor pad to jump to the next intersection



## 6. Using the Table

- Click the # button to open the Table window (either window can have focus; this button is on both the Graph and Graph Editor toolbars)
- Notice when  $x=1$ ,  $y_1$  and  $y_2$  are both 0 (the 1<sup>st</sup> intersection you found was  $xc=1$ ,  $yc=0$ )
- Notice when  $x=3$ ,  $y_1$  and  $y_2$  are both 2 (the 2<sup>nd</sup> intersection you found was  $xc=3$ ,  $yc=2$ )
- Click on the 8 button
- Change the start value to -10 and end value to 10 and then click OK
- Scroll to see all the values in the table
- Click any value in the **y1** column and then the **y2** column (What changes?)
- While the Table window has focus, click to close

Click to close



## PART I


### Practice Exercises

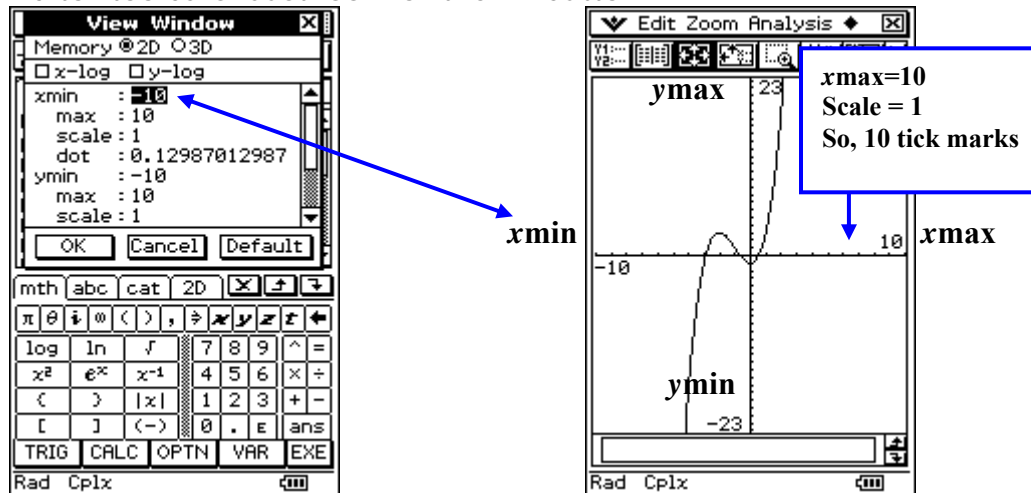
Before beginning the practice exercises, open a word document, type in the following information and then *save it as Lesson4 in your CASIO folder within My Documents*:

- Date: (enter today's date)
  - To: (put your instructor's name here)
  - From: (put your name here)
  - Re: Lesson 4
1. Please open the Graph & Table application and clear the window.
  2. Graph  $y1 = x^3 + 3x^2 - 1$ .
  3. Resize the Graph window (you can click **Resize** or press **Ctrl+r**).
  4. Get a **screen capture** and paste it into your Lesson4 document (under a title of PART I).
  5. Click **Resize** or press **Ctrl+r** again.
  6. Input  $y2 = 2x + 5$  and then graph **y1** and **y2**.
  7. If you do not see three intersections, open the Zoom menu and select Quick Standard.
  8. Find each intersection.
  9. Use the arrow keys to move between the intersections (either direction).
  10. Get a **screen capture** while the intersection with  $x_c = 1.4142135$  is showing. Please add two blank spaces following the first screen capture and paste this one.
  11. Open the Table window.
  12. Change the table values to start at -20 and end at 20.
  13. Set the table step size to 2.
  14. Get a **screen capture** with your table showing. Add two spaces following the last screen capture and paste this one. Thank you.

## PART II

In this part, we will work with changing our graph windows view. Why? Well, sometimes we need to explore graphs at x-values or y-values that are not currently showing in our window. When this happens we can open the View Window dialog and change our graph scale.

We use the View Window to change our current graph window settings. As with the Table button, the View Window button is on both the Graph and Graph Editor toolbars. Just look for the  button.



**xmin** – the smallest value showing on the x-axis.

**xmax** - the largest value showing on the x-axis.


**ymin** - the smallest value showing on the y-axis.

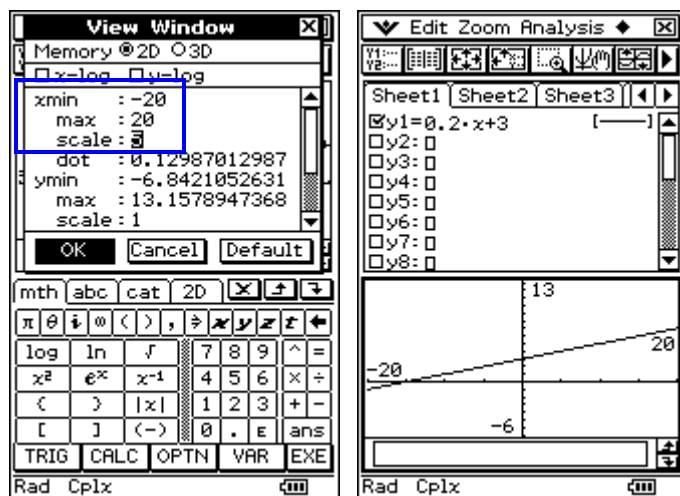
**ymax** - the largest value showing on the y-axis.

**Scale** - implies how often to place the tick marks on the axes.

**Dot** – has to do with pixel size. This value is pre-set for you.

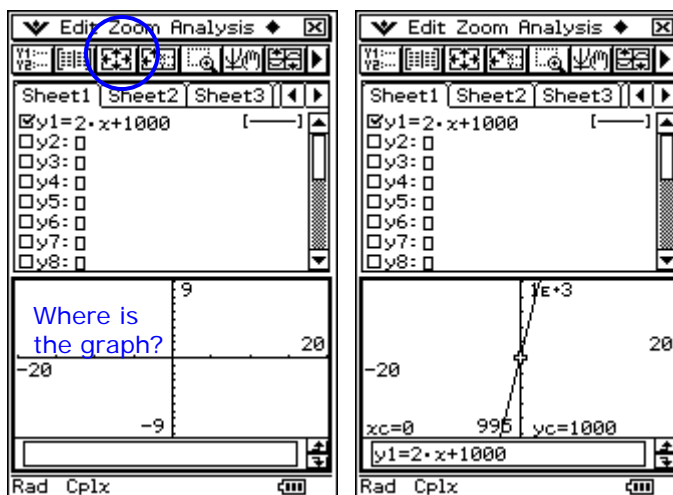
### 1. Changing the x-Axis and Scale

- Clear the Graph Editor window
- Click following **y1** and type in **.2x+3**
- Press **EXE** and Graph **y1**
- Click  to open the View Window dialog
- Change **xmin** to **-20** and **xmax** to **20** and **scale** to **5**
- Click **OK** to close the dialog
- Each tick mark on the x-axis is 5 units



## 2. Changing y-Axis Settings

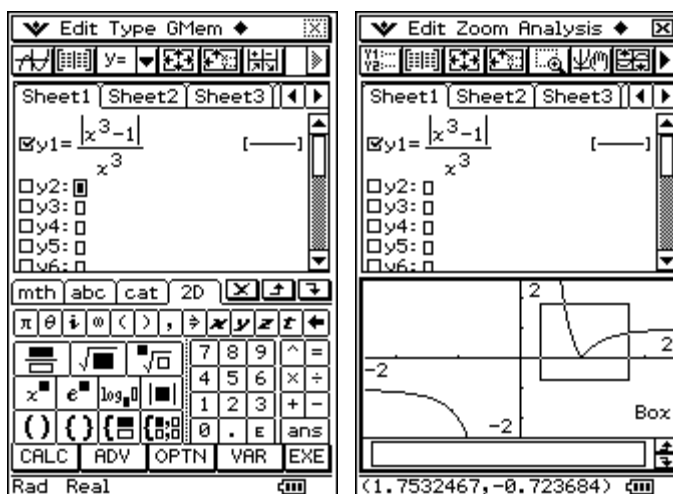
- Clear the Graph Editor window
- Click following **y1** and type in **2x+1000**
- Press EXE and Graph **y1**
- Click **6** to open the View Window dialog
- Change **ymin** to **995** and **ymax** to **1005**
- Click **OK** to close the dialog
- Select **Analysis/Trace**



## 3. Changing Window Settings – By Zooming

An easy way to change View Window settings is to zoom the window. Each time you zoom, the View Window settings change automatically. Remember, select Zoom/Quick Standard to return to a “normal” window.

- Select **2x+1000** and press back arrow
- Click **k** or press **Ctrl+k**
- For **y1** input  $\frac{x^3-1}{x^3}$
- Press EXE and then **\$**
- Select **Zoom / Quick Standard**
- Press the **+** and **-** keys a few times (quick zoom)
- Open the **Zoom menu** and select **Box**
- Press and drag (like I did) and let go
- Try other Zoom options



### Other things to try:

- You can shift the graph window by pressing the right, left, up or down arrows on your keyboard or cursor pad. Or, click the button and then press in the Graph window and drag.
- When the Graph window has focus, if you advance the toolbar by clicking the button, you will find more options. The menu provides even more options.

## PART II

### Practice Exercises

1. Please clear your Graph Editor window.
2. Set **y1 = x/(x-100)** and press EXE.
3. Graph **y1**. Change your **xmin** to **20** and **xmax** to **180** and click OK.
4. When x=90, what does y1 equal? Set **ymin** = 90/(90-100)
5. When x=110, what does y1 equal? Set **ymin** = 110/(110-100)
6. Click OK.
7. Get a **screen capture** and paste it into your Lesson4 document (under a title of PART II).
8. Click the Resize button or press **Ctrl+r** to enlarge the graph window.
9. Select **Analysis/Trace**. If xc=100 is not showing, type 100 and a dialog will automatically open. Set x-value to 100 and click OK.
10. Get a **screen capture**. Add two blank spaces following the last screen capture and paste this one. Think about why **x/(x-100)** is undefined when x=100.
11. Resize your window again to see the Graph Editor. Uncheck **y1**.
12. Let **y2=x^2** and press EXE.
13. Graph **y2** and then select **Zoom/Quick x^2**.
14. Open the View Window; **check** both boxes for **x-log** and **y-log**. Next, change the other settings to match the following screen capture and then press OK. Notice your parabola is now a straight line!




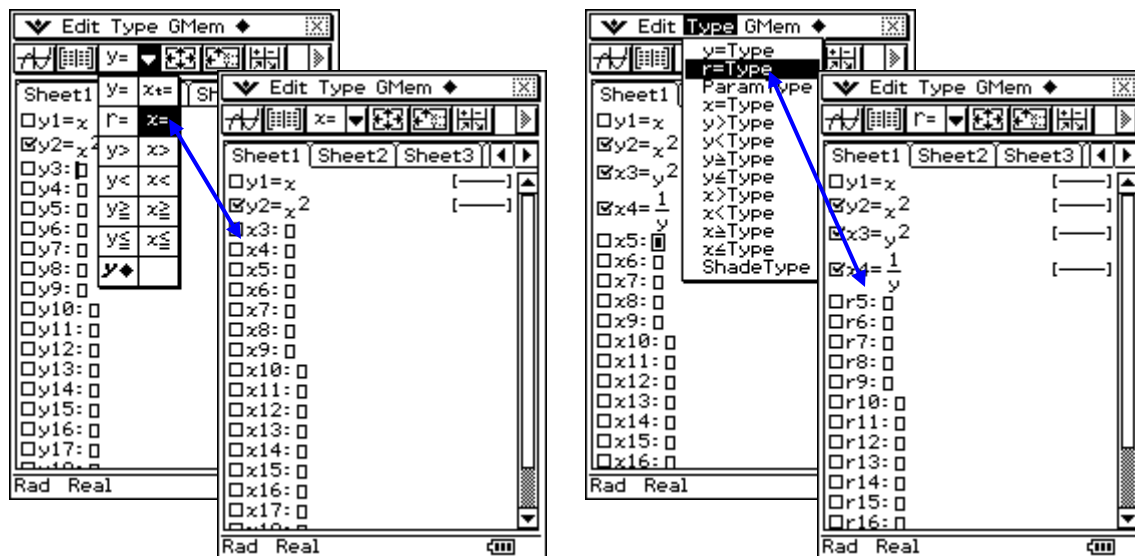
15. Get a **screen capture**, add two spaces following the second screen capture and paste this one.
16. **[Very Important!]** Open the **View Window** dialog; **uncheck x-log** and **y-log**. NEXT, click the **Default button** and then click **OK**.



## PART III


In this part, you will learn how to graph equations other than  $y$  as a function of  $x$ . You may remember that an equation is a function if each input produces exactly one output. If you have not learned about functions yet, you will someday. For now, let's begin graphing different types of curves that may or may not be functions!

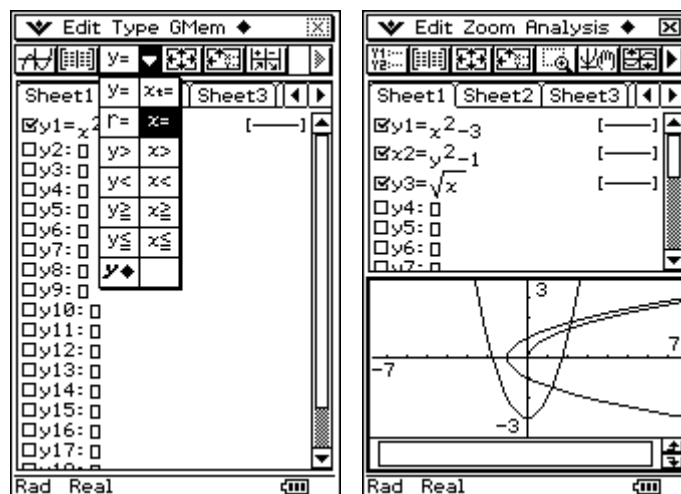
The  on the Graph Editor toolbar opens a button palette that contains a button for each item in the Type menu. We can graph many different types of curves in the same window. The type of graph we choose *will change* all graph positions that are empty.



### 1. Graphing with $y=$ and $x=$


**Make sure** you completed **#16 in Part II exercises** before beginning this part!

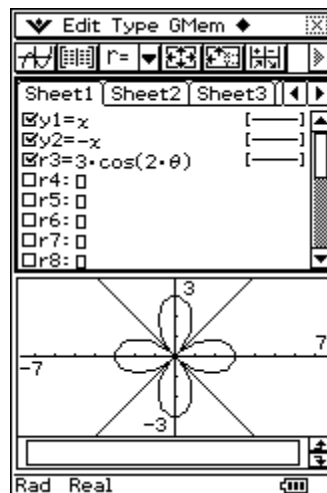
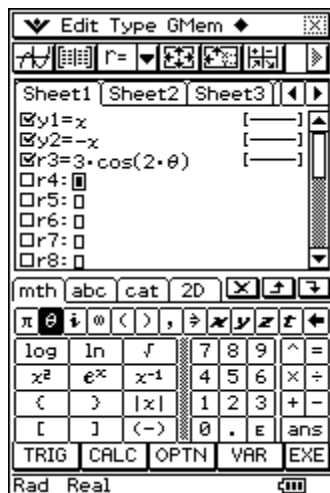
- Clear your Graph Editor window
- For **y1** input  $x^2-3$  and press EXE
- Click the  button and select h
- For **x2** input  $y^2-1$  and press EXE
- Graph the curves
- Open the **Type** menu and select **y=Type**
- For **y3** input  $\sqrt{x}$  and press EXE (Hint: Open the keyboard and use 2D)
- Graph again!



## 2. Graphing with $y=$ and $r=$

We use  $r$  and theta ( $\theta$ ) when graphing polar curves.


- Clear your Graph Editor window
- For **y1** input **x** and press EXE
- For **y2** input **-x** and press EXE
- Click the  button and select  $r$
- For **r3** input **3cos(2 $\theta$ )** and press EXE  
( $\theta$  is on the **math** page or you can press **Ctrl+t**)
- Graph the curves



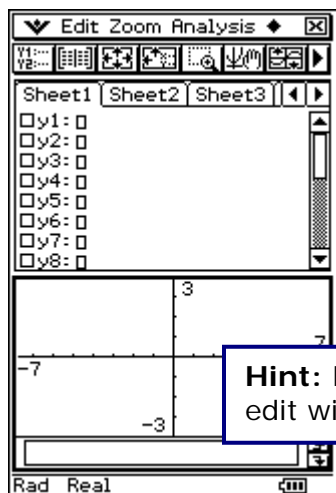
- Change **r3** to **3cos(3 $\theta$ )** and **graph again**
- Change **r3** to **3cos(4 $\theta$ )** and **graph again**
- Change **r3** to **3cos(5 $\theta$ )** and **graph again**
- Do you see a pattern? You are exploring special polar graphs from the "Rose Curves" family. You usually learn about these in Calculus.

## PART III

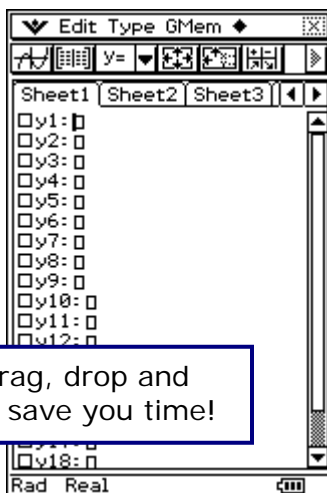
### Practice Exercises

- Start by clearing the Graph Editor's window. Remember, this is fun!
- Click  to maximize the Graph Editor window.
- Duplicate the given equations. Remember to look in the keyboard to find special characters and in 2D math for special symbols.

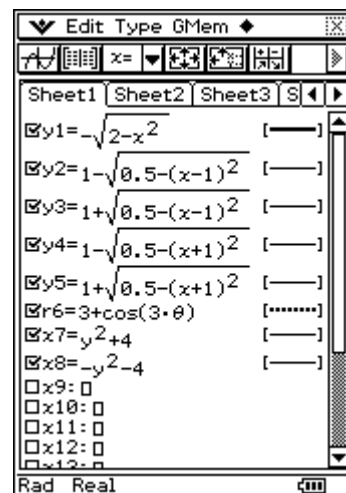
(1)



(2)

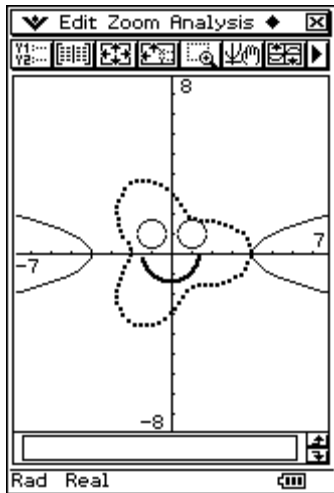


(3)

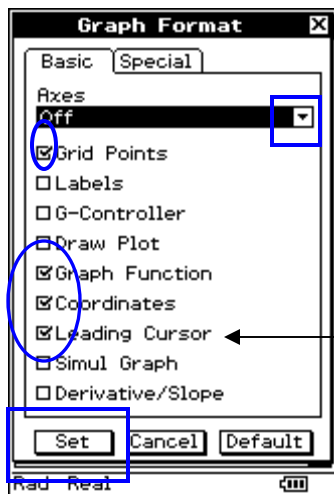


Hint: Drag, drop and edit will save you time!

4. Graph your equations and then select **Zoom/Square**.
5. Resize your window. If you input the equations correctly, your graph will look like this:



6. Get a **screen capture** and paste it into your Lesson4 document (under a title of PART III).
7. Open the **▼** menu and select Graph Format. Change the settings to match the ones below. Click the **Set** button to save the changes and exit.



This one is interesting!

8. Get a **screen capture**. Add two blank spaces following the last screen capture and paste this one.
9. Open the **Graph Format dialog** again.
10. Click the **Default** button and then the **Set** button.
11. Resize your window and uncheck **y5**.
12. Graph your equations again.
13. Get a **screen capture**. Add two blank spaces following the last screen capture and paste this one.

## PART IV

### Reflection Exercises

You have just completed the fourth lesson in ClassPad 101. The Graph application is very useful. Please take a few moments to copy and paste the following three questions at the end of your Lesson4 document and answer them.

1. Approximately how long did it take you to complete this lesson?
2. Which activity did you enjoy the most?
3. Did you find any part of this activity difficult to follow? If so, which part? Also, how did you overcome the difficulty?

### Assessment 4: Introduction to Graph & Table

- **Checkpoint:** Your word processed document, titled "Lesson4", should contain the following activities:
  1. Three screen captures from PART I.
  2. Three screen captures from PART II.
  3. Three screen captures from PART III.
  4. Three reflection questions with answers from PART IV.
- **Submit** your **Lesson4 document** to your instructor for grading. Once your lesson is submitted, your lesson for ClassPad 101 "Intro to Graph & Table" is complete.