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Valentine on TI-83 (short (and fun) lesson plan)

(based on **"Creating Valentine's message on a graphing calculator"**, by David Ebert, *Mathematics Teacher*, Feb. 2009, pp 404-405)

Overview

This activity uses a graphic calculator to draw a heart-shape, and then adds a text to add a finishing touch.

It is a short activity (~20 minutes), that can still touch on a few basic concepts (function, domain, etc), and encourage work with the graphic calculator.

Learning Objectives

Fun before Valentine day!   Side benefits include review of functions, plotting, and the use of TI-83.
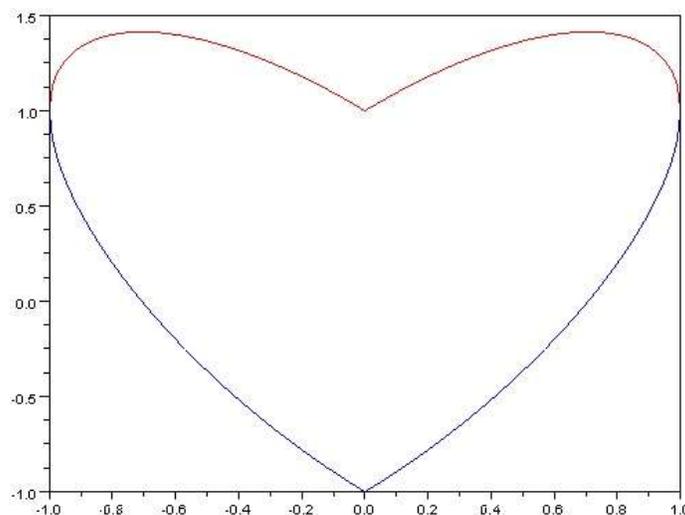
Prior Knowledge needed

Familiar with the drawing capability of graphing calculator.

Instruction and activity

It is a very open activity, so I will just point to possible subjects to discuss as you go through.

The graph we are trying to draw is depcited, in a little easier format, below.

1. Does this describe a function?   **No** – multiple 'y' values for one 'x' value.

2. What is the graph of $y_1 = |x|$?   What is it's domain over the real numbers?
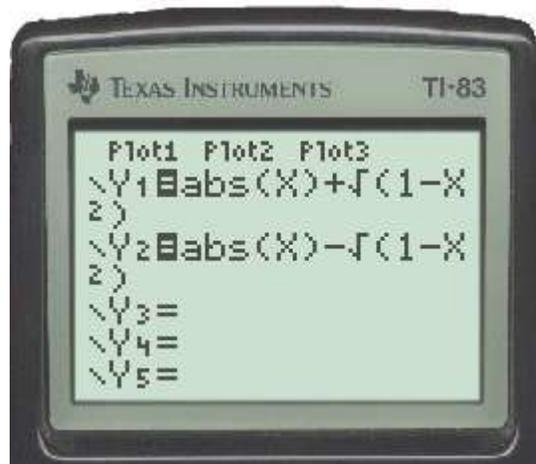
3. What is the graph of $y_2 = \pm\sqrt{1 - x^2}$?   What is it's domain over the real numbers?

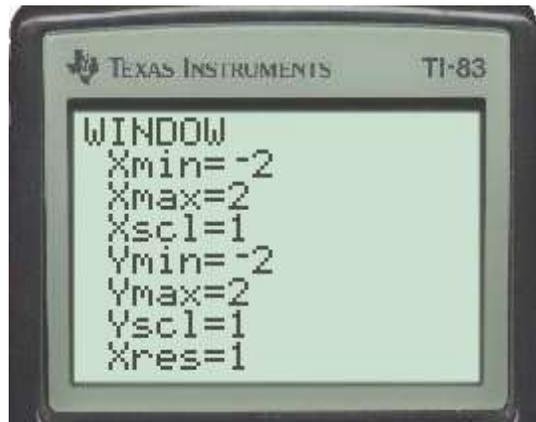4. Graph y_1 and y_2 on the same set of axis.

5. Use these to graph the two functions

$$y = |x| \pm \sqrt{1 - x^2}$$

Here are some helping notes to make it work on your TI: (See also the Student's sheet, with 'direction' only).

TEXAS INSTRUMENTS   TI·83

```
Plot1  Plot2  Plot3
\Y1￭abs(X)+√(1-X
2)
\Y2￭abs(X)-√(1-X
2)
\Y3=
\Y4=
\Y5=
```

a.   Plot the equations:
(the ABS function is under MATH -> NUM menu)

TEXAS INSTRUMENTS   TI·83

```
WINDOW
 Xmin=-2
 Xmax=2
 Xscl=1
 Ymin=-2
 Ymax=2
 Yscl=1
 Xres=1
```

b.   Set the limits in the WINDOW:

c.   Press 2nd+ZOOM (which will get you to the FORMAT menu), to turn off the axes.

d.   Press GRAPH to see the heart !!

e.   To add text, while in GRAPH mode, press 2nd+PRGM, and choose the 10th option (TEXT) to place a text on your graph.
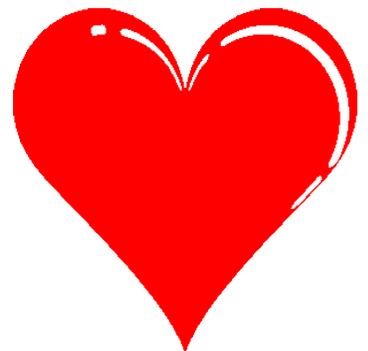
Some further exploration :

6. What equations would you graph to   (you will need to adjust the graphing window to see those right):
    a. Shift the heart three units up?
    b. Shift the heart three units to the right?
    c. Flip the heart upside down?
    d. Make it five-times bigger?

                        HAPPY   VALENTINE   Day !!

====End====

Valentine on your Graphing calculator!

Student page: Just the directions!   **Student Name:_____ Date:_____**

Step #	Description	hint	On your TI screen
1	Plot the equations.	ABS() function is under MATH -> NUM menu .	Plot1 Plot2 Plot3 \Y1■abs(X)+√(1-X²) \Y2■abs(X)-√(1-X²) \Y3= \Y4= \Y5=
2	Set the limits in the WINDOW.		WINDOW Xmin=-2 Xmax=2 Xscl=1 Ymin=-2 Ymax=2 Yscl=1 Xres=1
3	Turn off the axes.	Press 2nd+ZOOM (which will get you to the FORMAT menu), and select the AxesOff option.	RectGC PolarGC CoordOn CoordOff GridOff GridOn AxesOn AxesOff LabelOff LabelOn ExprOn ExprOff
4	Press GRAPH to see the heart !!		
5	Add text.	While in GRAPH mode, press 2nd+PRGM, and choose the 10th option (TEXT) to place a text on your graph.	I LOVE MATH