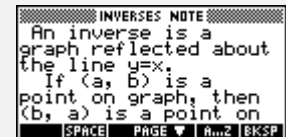


## Objectives:

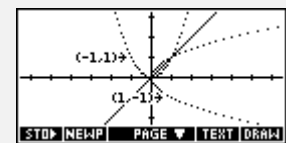
Using the **INVERSES** applet, the student will explore inverse relations and functions. The student will analyze relations and functions graphically, numerically, and symbolically.

## Functionality:

When the student presses **START**, the **INVERSES NOTE** will be displayed.



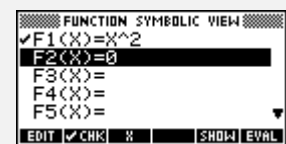
The student should then view the **SKETCH** for a visual explanation.



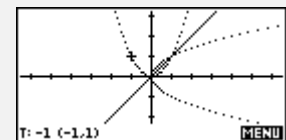
Pressing **VIEWS** will allow the student to enter the function, its inverse, to see the inverse relation and the inverse function.



The original function should be entered in **F1(X)**.



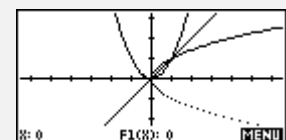
**Plot relations** will plot, in dot mode, the original function and its inverse relation. The line  $y=x$  is also in the plot.



Pressing **NUM** will display the table to verify to the student that the x and y coordinates have been interchanged.

T	Y1	X2	Y2
0	0	0	0
.1	.01	.01	.1
.sum	.04	.04	.4
.in	.16	.16	1.6
	.25	.25	2.5

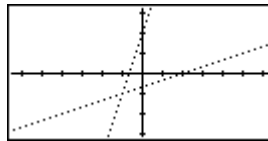
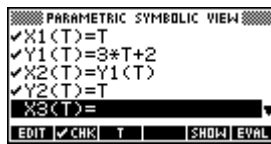
**Enter  $f^{-1}(x)$**  prompts the student to enter the inverse function in **F2(X)**. **Plot functions** will overlay the plot of the function and its inverse onto the relations plot.



**Additional Exploration:**

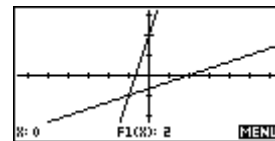
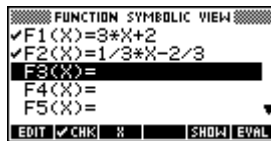
Using the **Parametric** applet, enter  $X1(T)=T$ ,  $Y1(T)=function$ ,  $X2(T)=Y1(T)$ , and  $Y2(T)=T$ . This plots the a function and its inverse relation parametrically. It is important to ensure that the values of Tmin and Tmax are chosen to allow the full graph to appear. The numeric view illustrates that the x and y coordinates have been swapped. An example would be:

Given  $f(x)=3x+2$ , plot  $f(x)$  and  $f^{-1}(x)$ .



T	Y1	X2	Y2
0	2	2	0
1	5	5	1
2	8	8	2
3	11	11	3
4	14	14	4
5	17	17	5
6	20	20	6
7	23	23	7
8	26	26	8
9	29	29	9
10	32	32	10

After plotting a function and its inverse parametrically, access the **Function** applet from the applet library. In the symbolic view, enter the function and its inverse in F1(X) and F2(X). To verify the inverse function, choose **Overlay Plot**. Overlay Plot will plot the functions in F1(X) and F2(X) over the parametric plot in the above example.



Programs associated with this applet:

.INV.PF, .INV.PR, .INV.I, .INV.F, .INV.R, .INV.ST, .INV.SV