

Exploring Inverses

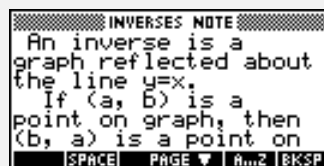
For the Teacher

Objectives:

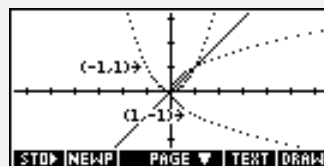
Using the **INVERSES** applet, the student will explore inverse relations and functions. The student will analyze relations and functions graphically, numerically, and symbolically.

Functionality:

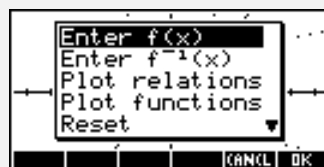
When the student presses **START**, the **INVERSES NOTE** will be displayed.



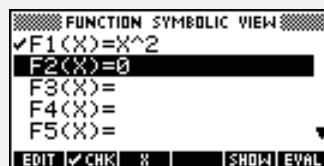
The student should then view the **SKETCH** for a visual explanation.



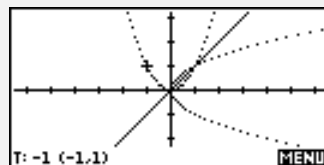
Pressing **VIEWS** will allow the student to enter the function, its inverse, to see the inverse relation and the inverse function.



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.

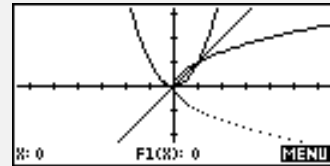


Pressing **NUM** will display the table to verify to the student that the x and y coordinates have been interchanged.

T	Y1	X2	Y2
0	0	0	0
0.01	.01	.01	.01
0.04	.04	.04	.04
0.09	.09	.09	.09
0.16	.16	.16	.16
0.25	.25	.25	.25
0			
0			

At the bottom are buttons: ZOOM, BIG, DEFN.

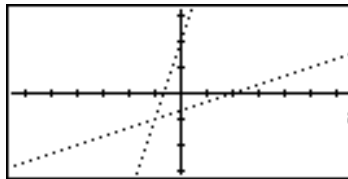
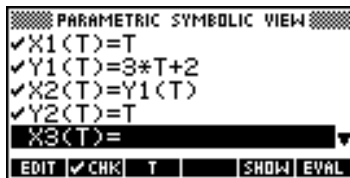
Enter $f^{-1}(x)$ prompts the student to enter the inverse function in **F2(X)**. **Plot functions** will overlay the plot of the function and its inverse onto the relations plot.



Additional Exploration:

Using the **Parametric** applet, enter $X1(T)=T$, $Y1(T)=\text{function}$, $X2(T)=Y1(T)$, and $Y2(T)=T$. This plots the a function and its inverse relation parametrically. The numeric view illustrates that the x and y coordinates have been swapped. An example would be:

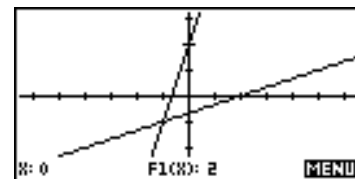
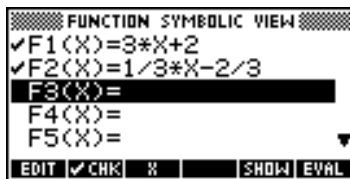
Given $f(x)=3x+2$, plot $f(x)$ and $f^{-1}(x)$.



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

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.



Ideas can be applied to:

Algebra I, Algebra II, Trigonometry, Precalculus, Calculus

Programs associated with this applet:

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