

Exploring Basic Functions Teacher

For the

Objectives:

Using the **BASIC FUNCTIONS** applet, the student will be able to explore stretches, shrinks, and translations of seven basic graphs.

Functionality:

When the student selects **START**, the **BASIC FUNCTIONS NOTE** will be displayed.



The student should then press **VIEWS** will to choose a basic function to be explored, to enter a value for A, H or K to see each parameter's effect on the basic graphs. The basic function is in the form $f(x) = A \cdot f(x - H) + K$.

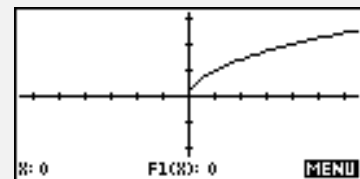


Basic f(x) allows the student to choose one of seven basic functions:

$$y=x, y=x^2, y=x^3, y=|x|, y=\sqrt{x}, y=1/x, y=1/x^2.$$



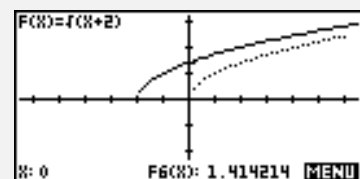
When one of the basic graphs is chosen, the dotted plot of the curve appears on a blank screen and then is plotted on the axes. Return to **VIEWS** to input values for A, H or K.



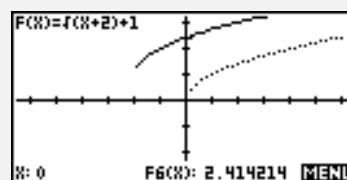
Selecting **Enter A**, **Enter H**, or **Enter K** will display the equation of the current function and prompt the student for a value.



After entering **OK**, the function and its changes are plotted with the expression for the “new” function displayed on the screen.



Until you **Reset A,H,K** , or choose a different basic function, the changes continue to be updated as seen in the example to the right. The default values are $A = 1$, $H = 0$ and $K = 0$.



Additional Exploration:

Find the domain and/or range for a function using the Numeric view. Using the **Function** applet, have students enter a function in $F1(X)$. Use the up and down arrows in the numeric view to analyze the defined x and y values:

Find the domain and range of $y = \sqrt{x+2} + 1$.

FUNCTION SYMBOLIC VIEW	
✓	$F1(X) = \sqrt{X+2} + 1$
	$F2(X) =$
	$F3(X) =$
	$F4(X) =$
	$F5(X) =$
EDIT	✓CHK X SHOW EVAL

FUNCTION NUMERIC SETUP	
NUMSTART:	0
NUMSTEP:	.1
NUMTYPE:	Automatic
NUMZOOM:	4
ENTER INCREMENT VALUE	
EDIT	PLT

X	F1		
-2.3	UNDEF.		
-2.2	UNDEF.		
-2.1	UNDEF.		
-2.0	1		
-1.9	1.316228		
-1.8	1.447214		
$\sqrt{X+2} + 1$			
ZOOM	BIG	DEF	

Ideas can be applied to:

Algebra II, Precalculus, Advanced Algebra, Calculus

Programs associated with this applet:

.BF.S, .BF.R, .BF.K, .BF.H, .BF.A, .BF.C, .BF.SV

Basic FunctionsA $f(x - H) + K$

Name _____

Date _____

Directions: Choose the **BASIC FUNCTIONS** applet. Press **START**. Once you have read the note, press **VIEWS** to make your next choice. Complete the table with the information you obtain from each given function.

Function	Basic f(x)	A	H	K	Translation	Sketch
1. $f(x) = \sqrt{x+2} - 1$						
2. $f(x) = \frac{1}{2}(x-3)^2 + 2$						
3. $f(x) = \frac{2}{x-1} - 3$						
4. $f(x) = \frac{-2}{x^2 + 1} + 1$						
5. $f(x) = \frac{1}{5}(x+4)^2 - 3$						
6. $f(x) = -3 x+2 -1$						