## Exploring Basic Functions

### *Objectives:*

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

### *Functionality:*

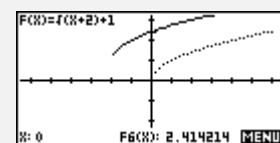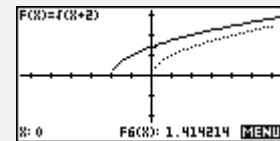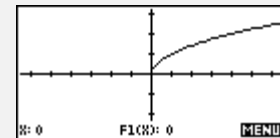When the student selects **START** , **the BASIC FUNCTIONS NOTE** will be displayed.

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 form is: **f(x) = A∗f(x - H) + K.**

**Basic f(x)** allows choice from 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.
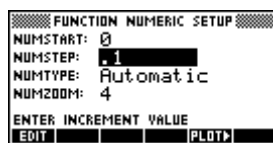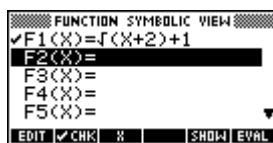
Selecting **Enter A** , **Enter H** , or **Enter K** displays the equation of the current function and prompts for a value. After entering **OK** , the function and its changes are plotted with the expression for the "new" function also displayed.

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:*

Use Function to explore the domain and/or range using the **NUM** view. Enter a function in F1(X) & use the up/down arrows in **NUM** to analyze the defined x and y values: Eg. Find the domain and range of $y = \sqrt{x+2} + 1$.

Programs associated with this aplet:
.BF.S, .BF.R, .BF.K, .BF.H, .BF.A, .BF.C, .BF.SV

Directions: Choose the **BASIC FUNCTIONS** aplet.  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. $f(x) = \dfrac{1}{2}(x-3)^2 + 2$ | | | | | |  |
| 3. $f(x) = \dfrac{2}{x-1} - 3$ | | | | | |  |
| 4. $f(x) = \dfrac{-2}{x^2+1} + 1$ | | | | | |  |
| 5. $f(x) = \dfrac{1}{5}(x+4)^2 - 3$ | | | | | |  |
| 6. $f(x) = -3|x+2| - 1$ | | | | | |  |