**LIMITS – Calculator Exploration**

Introduction

On the *TI-84 Plus*, input the following function into **Y1 =**

 **X2 + 3x – 12**

And evaluate it at **x = 1, 10, 13, -2, 2.4**

To evaluate this function for multiple x-values, you can use this neat trick!

**Hit VARS 🡪 Select Y-VARS 🡪 Select Function 🡪 Select Y1**

**Then enter your desired x-value in parenthesis.**

Example : Y1 (1) = -8 *Now try the others!!*

Exploration

Limits are used to describe the behavior of a function’s outputs “in the neighborhood” of a number x=*a,* where the function may or may not be defined. In order for the limit to exist, the function’s outputs must “approach” the **same** number as you approach from the left and right of x=*a*. You can explore limits numerically (by looking at output values), graphically, and algebraically.

Consider the function . Let’s investigate its behavior near . We need to approach 2 from the right and from the left. Compute the following:

 

We can also gather evidence graphically by observing the behavior in the neighborhood of .

The limit can be computed algebraically by factoring the numerator, and reducing the expression.

**IN YOUR PRACTICE NOTEBOOK!**

(1-12) For each of the following, where  is presented:

1. Evaluate  if it is defined
2. Sketch the graph near x=*a*
3. Estimate the limit as x approaches a (You may use **TRACE**)

1. 

2. 

3. 

4. 

5. , where 

6. 

7.  where 

8. 

9. 