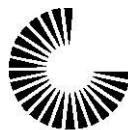
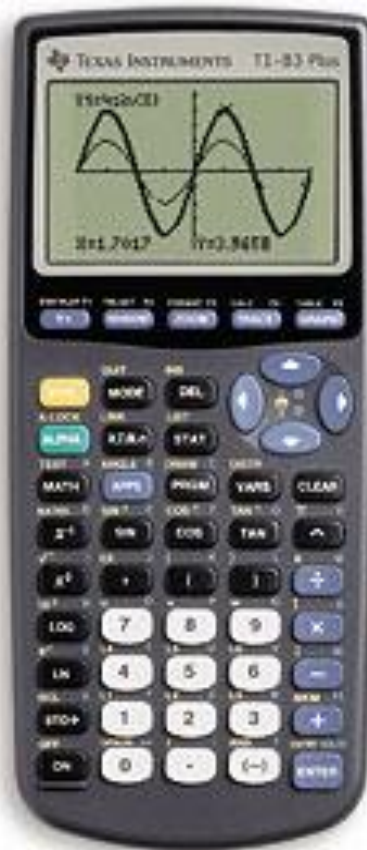
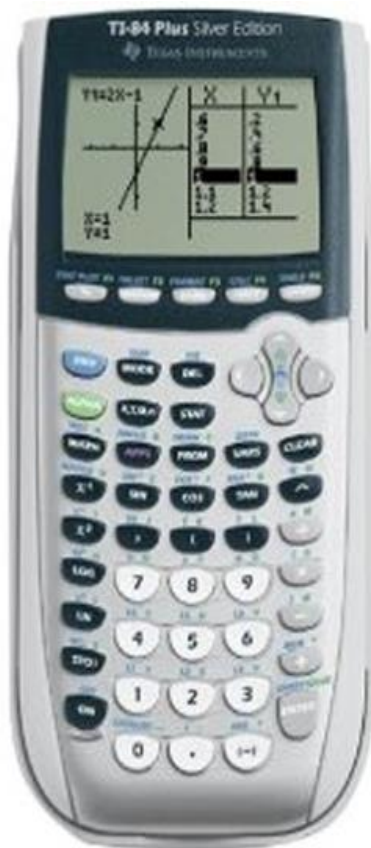


# Graphing Calculator Workshop



CHANDLER-GILBERT  
COMMUNITY COLLEGE

Learning Center

# Workshop III

## Learning Objectives

- In this workshop you will learn how to:
  - Find the zeroes of a function (horizontal intercepts or x-intercepts of a function)
  - Find the Minimum and Maximum points of a function
  - Find the vertical intercept (or y-intercept) and a specific  $f(x)$  value for a given input (“x” value)
  - Find intersection points of two functions
  - Graph a piecewise function
  - Graph the solution set of points (feasible area) of two inequality equations

# Graphing Calculator Workshop III

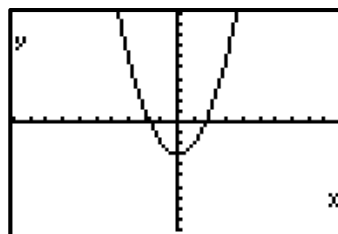
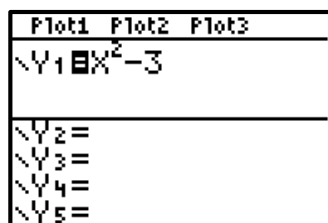
## I. Find the Zeroes of a Function

- a. When you are given a function to find its zeroes, you first need to graph the function in your calculator as follow

Y=

Function:  $f(x) = x^2 - 3$

GRAPH

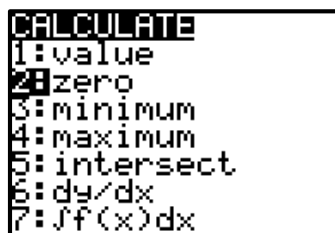


- b. Once you have the graph, you need to make the following selections:

2nd

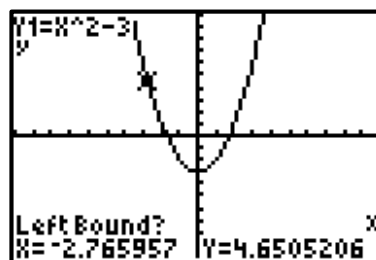
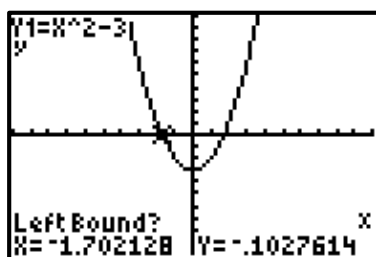
TRACE

then select 2: Zero from the CALCULATE menu



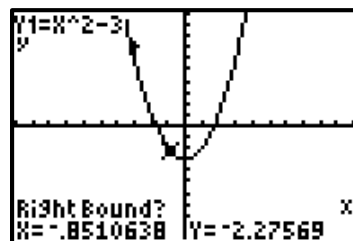
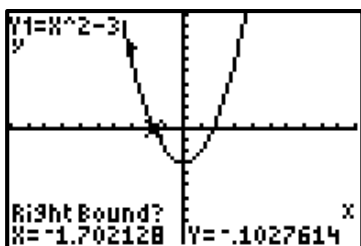
- c. Next, you need to specify the general location where the zero (x-intercept) is located. These specifications are called the Left Bound and the Right Bound. The calculator will first ask for the Left Bound:

- c1. First place the cursor approximately where the zero is located. Then press the left arrow key a few times and this will move the cursor to the “Left Bound” area. Once this is done, press ENTER.

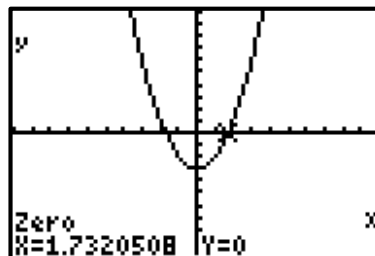
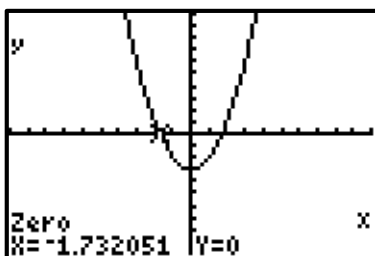
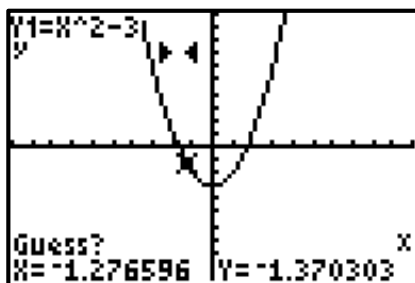


- c2. Next, the calculator will ask for the right bound. Move the cursor back to where the zero is located. Then press the right arrow key a few

times and this will move the cursor to the “Right Bound” area. Once this is done, press ENTER.



c3. The calculator will now ask you to “guess” where the zero is. Ignore this and just press ENTER.



c4. Repeat the procedure for any other zeroes (x-intercepts)

## II. Find the Minimum and Maximum points of a Function

a. First, graph the function  $f(x)$  in your calculator as follow

Y=

$$\text{Function: } f(x) = .2x^3 - 2x + 5$$

GRAPH

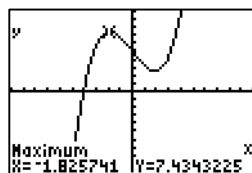
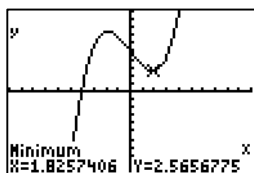


- b. Select **2nd** **TRACE** Keys to choose the 3:minimum or 4:maximum option under the CALCULATE menu

```

CALCULATE
1:value
2:zero
3:minimum
4:maximum
5:intersect
6:dy/dx
7:∫f(x)dx
  
```

- c. Once you made your previous choice, you will see your graph in the screen ready to select the Left Bound and the Right Bound (same procedure as described for finding the “zeroes” of a function) of a minimum or a maximum point to find its coordinates



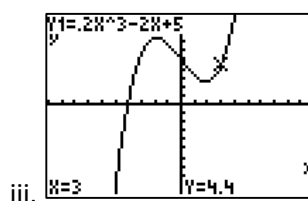
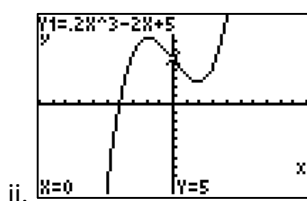
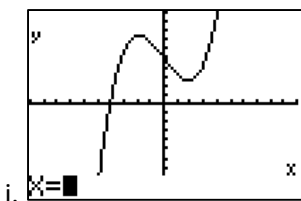
### III. Find the vertical intercept (y-intercept) and a specific output (f(x) value) for a given input (“x” value)

- a. Use the previous graph to select the **2nd** **TRACE** keys to display the CALCULATE menu and to choose 1:value to find the y-intercept or any other f(x) value in the graph

```

CALCULATE
1:value
2:zero
3:minimum
4:maximum
5:intersect
6:dy/dx
7:∫f(x)dx
  
```

- b. You will see X= on the lower left corner of the graph (figure i) where you have to type “0” and the **ENTER** key if you want to find the y-intercept (figure ii) or type any other “x” value (figure iii) and the **ENTER** key to find its f(x) value (also known as “y” value).

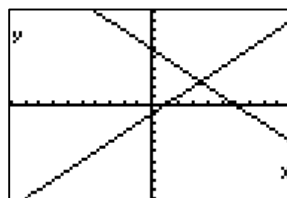
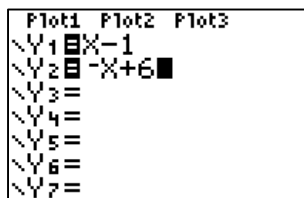


**Note:** The value function can only be used for input values that fall within the Xmin and Xmax that are currently set for the graph window. Any attempt to use a value outside the Xmin and Xmax will result in an error message. So you may need to reset the Xmin and/or Xmax values before using the value function.

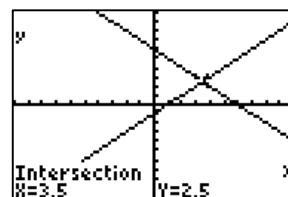
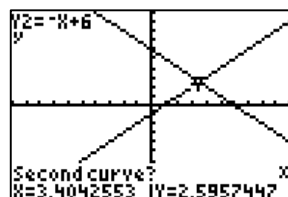
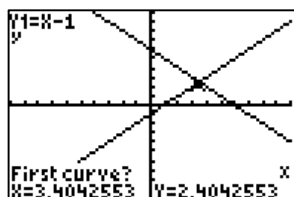
#### IV. Find the intersection points of two functions

a. Graph the given functions as follow below

$Y=$  Functions:  $f(x) = x-1$  and  $g(x) = -x+6$  **GRAPH**

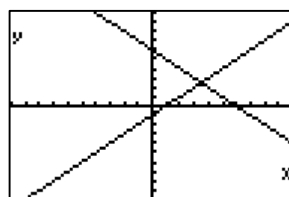
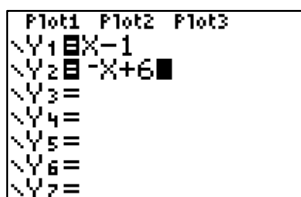












b. Press the **2nd** **TRACE** keys and then select 5: intersect under the CALCULATE menu. The calculator will then prompt you to select the two functions that you want to determine the intersection(s). These will be referred to as the “first curve” and the “second curve”. By default, the calculator will begin with the function in  $Y_1$ . If you only have two functions that are graphed, then you can just press **ENTER** **ENTER** **ENTER** to be able to see the coordinates of the intersection point of these two graphs. If you have more than two functions, you can use the up or down arrow to go through each of the functions and pressing Enter when you get to your functions of interest.





#### V. Graph the solution set of points (feasible area) of two inequality equations

a. Type two inequality equations, such as  $y \leq x-1$  and  $y \geq -x+6$ , as follow below  $Y=$  Equations:  $y \leq x-1$  and  $y \geq -x+6$  **GRAPH**

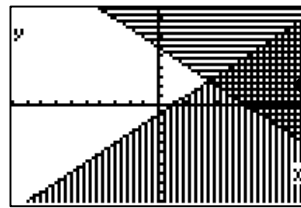


- b. To see the feasible area between the two equations, change the graph style of the first equation by moving the cursor with  key to the right side of Y<sub>1</sub> and press    to select  (this shading covers the area below the graph). Next, change the graph style of the second equation by moving the cursor with  key to the right side of Y<sub>2</sub> and press   to select  (this shading covers the area above the graph). Finally, press  to see the feasible area as shown below.

```

Plot1 Plot2 Plot3
Y1  X-1
Y2  -X+6
Y3 =
Y4 =
Y5 =
Y6 =
Y7 =

```



The darker shaded area is the feasible area which represents the solution set of points of the two given inequality equations

## VI. Graph a Piecewise Function

- a. Let  $f(x)$  be a piecewise function as the one shown below






$$f(x) = \begin{cases} -5 & x \leq -3 \\ x^2 & -3 < x \leq 3 \\ x & x > 3 \end{cases}$$

- b. To graph this piecewise function, we need to follow this order: (first piece)(first condition) +(second piece)(second condition)+ ... Thus, this specific function need to be typed in the following order:

$$(-5)(x \leq -3) + (x^2)(-3 < x \text{ and } x \leq 3) + (x)(x > 3)$$

or

$$(-5)(x \leq -3) + (x^2)(-3 < x)(x \leq 3) + (x)(x > 3)$$

- c. Start entering the function by selecting  and then enter the function following any of the two orders shown on part “b”. Press   every time is needed to select an inequality symbol; if you need to enter the word “and” press  , right arrow to LOGIC and select option 1.

Your function and graph should appear on the  $Y=$  screen and the **GRAPH** screen as follow

```
Plot1 Plot2 Plot3
\Y1= -5)(X<-3)+(
X^2)(-3<X and X≤
3)+(X)(X>3)
\Y2=
\Y3=
\Y4=
\Y5=
```

