

Exploring the Zeros of a Function on the Graphing Calculator

Part I: What is a zero of a function?

Let's begin with a linear function. Enter $f(x) = y1 = 2x + 4$ in your graphing calculator.

Set the TBLSET so the table values begin at $x = -5$ and change by steps of 1 as illustrated at the right.



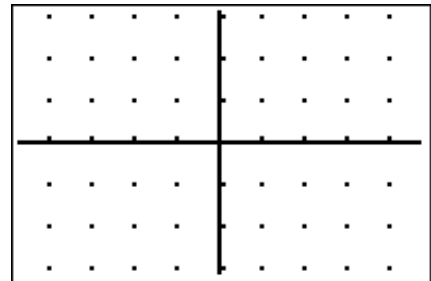
Create a table of values associated with this function. Copy the seven sets of values from the table in the table below.

x							
y							

Notice that the x begin at $x = -5$ and increase by 1. Notice that there is a function value for $x = 0$. What is the value of $f(0)$? _____ What would be the coordinates of this point? _____ What name to we give this point? _____

Notice that the values of y also contains a zero. What value of x makes the y value zero? We call this the value of x the zero of the function.

Both of these points have a significance to the graphing of the function. Graph this function in a zoom 4. Decimal window with the grid turned on. Record your graph in the space at the right. Locate the two points identified above



In your own words describe that the significance of these two points:

(____, ____): _____

(____, ____): _____

Describe how you would use the equation $f(x) = y1 = 2x + 4$ to locate the y-intercept.

Describe how you would use the equation $f(x) = y1 = 2x + 4$ to locate the zero of the function. _____

Part II: Enter the equation $f(x) = y1 = x^2 + 2x - 8$ in your graphing calculator.



Press TBLSET and set up the values as illustrated at the right. Create a table of values for this function beginning at $x = -5$ and increasing by steps of 0.5. Scroll down the table until you locate the y-intercept. The coordinates of this point are _____.

Now scroll through the table until you locate a zero for this function. Record 5 sets of values near the zero of this function.

x					
y					

Continue to scroll through the table. Does it appear that the function has another zero? Name the coordinates of the point. _____ Record 5 sets of values near the zero of this function.

x					
y					

Continue to scroll down the table until the first zero is at the top of the table. Record these values in the following chart.

x							
y							

Before you create a graph of this function describe the significance of a zero of a function when the function is graphed and what you expect to see.



Before you graph this function in a zoom 6 Standard window (with $x scl = y scl = 2$) label all the zeros and y-intercept for this function on the graph at the right.

Create a graph of this function in a zoom 6 Standard window (with $x scl = y scl = 2$) to confirm

your thoughts about the graph of this function. Record the graph in the space provided.

When you are finding a zero for a function you are asking where does the function equal zero. In other words we are asking where does $f(x) = x^2 + 2x - 8 = 0$. Solve this equation for x by factoring.

$$x^2 + 2x - 8 = 0$$
$$(\quad)(\quad) = 0$$
$$x = \underline{\quad}, \quad x = \underline{\quad}$$

What is the significance of these two value when you think about the table of values associated with the function and when you think about the graph of the function?

Part III: Enter the equation $f(x) = y = x^3 - 2x^2 - x + 2$ in your graphing calculator.

Press TBLSET and set up the values as illustrated at the right. Create a table of values for this function beginning at $x = -3$ and increasing by steps of 0.5. Record the first seven sets of values in the table below.

```
TABLE SETUP
TblStart=-3
ΔTbl=.5
Indent:  Auto Ask
Depend:  Auto Ask
```

x							
y							

From the table can you determine the y-intercept? Name the coordinates of the point.

Does it appear that the function has one zero? Name the coordinates of the point. _____

Continue to scroll down the table until the first zero is at the top of the table. Record these values in the following chart.

x							
y							

Do there appear to be additional zeros for this function? Name the coordinates of the additional zeros. _____

Scroll down the table past $x = 2$ to view the function values. What do you observe from the table values?

Scroll up the table past $x = -3$ to view the function values. What do you observe from the table values?

Before you create a graph of this function describe the significance of a zero of a function when the function is graphed and what you expect to see.

Before you graph this function in a zoom 4. Decimal window label all the zeros and y-intercept for this function on the graph at the right.



Create a graph of this function in a zoom 4. Decimal window to confirm your thoughts about the graph of this function. Record the graph in the space at the right.

When you are finding a zero for a function you are asking where does the function equal zero. In other words we are asking where does $f(x) = x^3 - 2x^2 - x + 2 = 0$. Solve this equation for x by factoring. (Using the zeros of the function may help you factor this polynomial.)