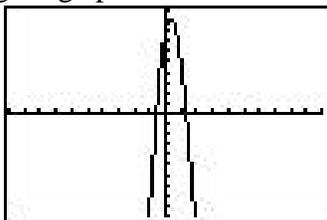


**Topic #4 – Viewing Windows**

**Task #1:** Graph the function  $y = x^3 - 11x^2 + 7x + 8$

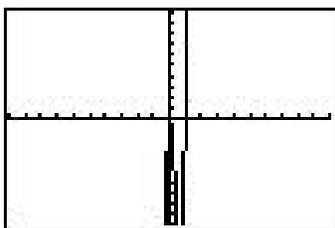
**Strategy :** By entering the function at the Y= menu and selecting zoom standard, we get a graph which looks like an upside-down parabola, as shown below.



But this is not the whole picture! We need to change our perspective and look at the big picture (mankind believed for millions of years that the earth was flat because of their poor perspective). We know that we are missing part of the picture because the function that we are trying to graph is cubic, and yet the graph looks like that of a quadratic function (a parabola). To look at the big picture, press **WINDOW** and change the window to:

$$\begin{aligned} X_{\min} &= -100 \\ X_{\max} &= 100 \\ X_{\text{scl}} &= 10 \\ Y_{\min} &= -100 \\ Y_{\max} &= 100 \\ Y_{\text{scl}} &= 10 \\ X_{\text{res}} &= 1 \end{aligned}$$

Press **GRAPH** to display the graph with these new window settings. We can now see from the graph (shown below) that there is actually one more turn to the graph than we had seen on the previous picture.



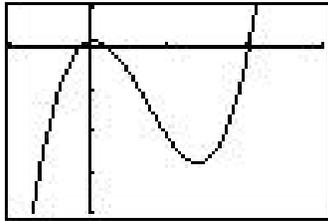
This is still not a very good window, but we can use this picture to determine a better window. In our previous window settings, we defined  $X_{\text{scl}}$  and  $Y_{\text{scl}}$  to both be 10; that means that each tick mark along both axes represents 10 units. Looking at our picture again, it appears that all of the action in the x-direction takes place between -5 and 15, while we need to go even further down to see the rest of the action in the y-direction, say from -200 to 50 in the y-direction. Change the window settings one last time to:

$$\begin{aligned} X_{\min} &= -5 \\ X_{\max} &= 15 \end{aligned}$$

Xscl = 5  
Ymin = -200  
Ymax = 50  
Yscl = 50  
Xres = 1

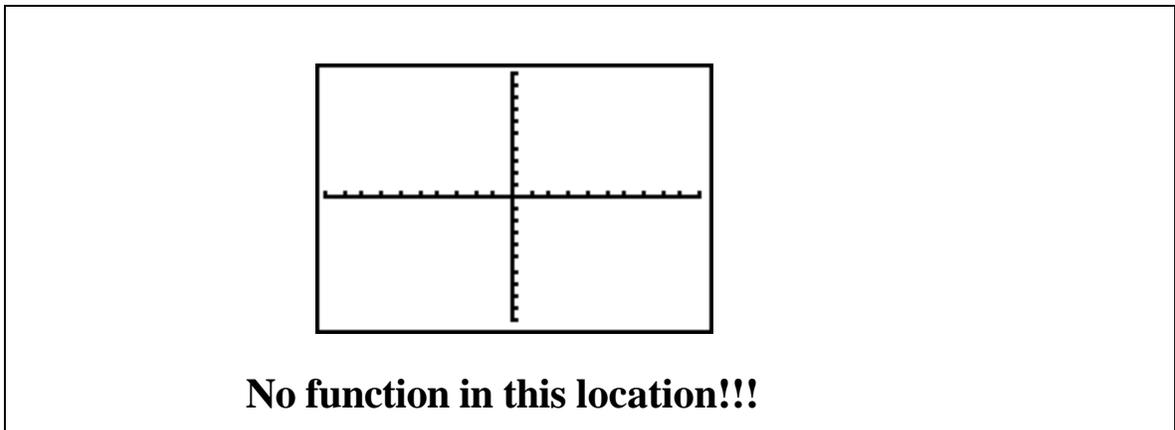
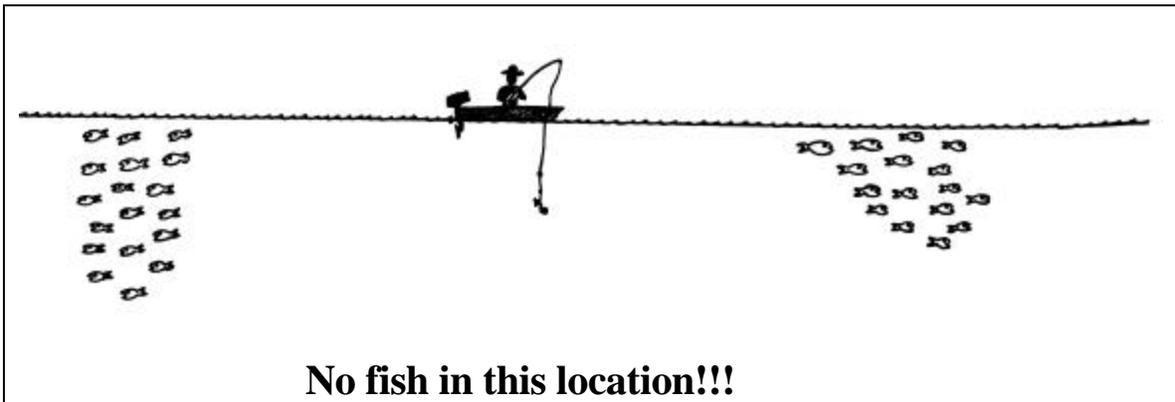
Press **GRAPH** to display the graph with these new window settings.

Conclusion: Your graph should now look like this.



**Task #2:** Graph the function  $y = x^2 - 150$ .

Strategy: By entering the function at the Y= menu and selecting zoom standard, we get a blank screen! The problem here is that we are not looking in the right spot for our graph.

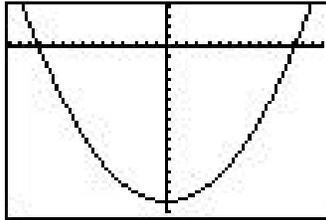


If we press **TRACE**, we see that the y-value is  $-150$  when  $x = 0$ , so we need to adjust the Ymin. Press **WINDOW** and change the window until you see all of the action. Try to pick values on your own, using trial and error. Your window values will probably be close to these when you are finished adjusting the window:

Xmin = -15  
Xmax = 15  
Xscl = 1  
Ymin = -160  
Ymax = 40  
Yscl = 10  
Xres = 1

Press **GRAPH** to display the graph with these new window settings.

Conclusion: Your graph should now look similar to this:



**You Try:** Graph the function  $y = 0.1x^3 + 50000$  over a 4-week period, where  $y$  represents the number of bacteria in a colony and  $x$  is the number of days after detection of the colony.

**Conclusion**

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